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ABSTRACT

This document was designed to highlight the activities of a conference dealing with careers in the environmental field. The conference was organized with the intention of helping college students, recent college graduates, and others to learn the realities of various environmental careers from professionals working in the corporate, government and nonprofit sectors. In addition, it was designed to help the attendees gain a better understanding of how to plan for a career as an environmental professional. The publication provides information on: (1) the roles of environmental professionals in corporations, government agencies and nonprofit organizations; (2) important current and future environmental issues and the challenges and opportunities that they present for environmental professionals and their organizations; and (3) education, experience and job search techniques needed to start a career in the environmental fields. The appendices include a list of environmental career planning resources, a profile of the conference participants, and a feedback sheet for readers. (TW)

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BECOMING AN ENVIRONMENTAL PROFESSIONAL
Strategies for Career Planning

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CONFERENCE SUMMARY

Proceedings from the environmental careers conference on Saturday, November 8, 1986 in Ann Arbor, Michigan sponsored by The CEIP Fund and The University of Michigan School of Natural Resources.

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"BECOMING AN ENVIRONMENTAL PROFESSIONAL --
STRATEGIES FOR CAREER PLANNING"

Conference Summary

Preceedings from the environmental careers conference on Saturday, November 8, 1986 in Ann Arbor, Michigan sponsored by The CEIP Fund and The University of Michigan School of Natural Resources.

Produced by:
The CEIP Fund
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Introduction by John R. Cook, Jr., President, The CEIP Fund, Inc.

We are pleased to present this publication containing all the highlights, insights and important advice from the conference "Becoming an Environmental Professional -- Strategies for Career Planning," which was held on Saturday, November 8, 1986 in Ann Arbor, Michigan. Co-sponsored by The CEIP Fund, Inc. and The University of Michigan School of Natural Resources, the event featured over thirty environmental professionals from fifteen government agencies at all levels, ten corporations and nine nonprofit organizations. Over 170 college students, recent graduates, college advisors as well as career changers, high school students and various professionals from nine states attended the conference.

The event in Ann Arbor was the third consecutive year The CEIP Fund has sponsored an environmental careers conference. Since 1984, there have been five conferences co-sponsored with either the Student Conservation Association (1984, 1985) or The University of Michigan School of Natural Resources (1985, 1986). Conference sites have been Cleveland, Ann Arbor, Seattle and San Francisco. This is the first conference summary we have produced.

Through the conference, we helped college students, recent graduates and many others: (1) Learn the realities of various environmental careers from professionals working in the corporate, government and nonprofit sectors, and (2) Gain a better understanding of how to plan for a career as an environmental professional. The event was not a jobs fair or "pep rally" for the environmental professions. Through panel sessions, presentations, mini-sessions, discussions and the keynote address, participants were given an inside look at working in the environmental field from the professionals who are involved with the issues, problems, challenges and opportunities on a daily basis.

No matter what your interest in the environmental professions or where you are located, this publication will give you information on:

* Roles of environmental professionals in corporations, government agencies and nonprofit organizations.
* Important current and future environmental issues and the challenges and opportunities they present for environmental professionals and their organizations.
* Education, experience and job search techniques needed to start a career in the environmental fields.

I trust this publication will help you plan more effectively for your career. We wish you well in your endeavors and encourage you to pursue your career interest with enthusiasm, hope and persistence. The opportunities are there for those who prepare themselves to meet the needs of the corporations, government agencies and nonprofit organizations working to protect the environment and manage our natural and urban resources.

Finally, we welcome your comments, ideas and suggestions. Please see Appendix 3, page 110 where we have provided a range of questions. We would value your responses which will help us in developing environmental career planning programs and publications.

Acknowledgements

On behalf of The CEIP Fund/Professional Development Services, I would like to acknowledge the contributions of the following people and organizations who helped make the conference a success and made this summary a reality.

The conference was made possible through the staff services and financial support of The University of Michigan School of Natural Resources (SNR). Connie Ruth, Placement Coordinator, did an excellent job of planning SNR's efforts for the conference. We also appreciate the assistance of Sandra Gregerman, Student Services Associate and William Robinson, Jr., Coordinator of SNR's Office of Academic Programs. In addition, we would like to thank James Crowfoot, Dean of SNR, who originally invited CEIP to work with his staff on the conference.

The following SNR students provided valuable assistance before and during the conference: Cinder Hypki, Lisa LaRocque and Jim Welsh.

Another group of SNR students deserve special credit -- Jean Battle, Victoria Mehl, Robin Rhein and Bennett Sandler. They were the notetakers at the conference who produced written summaries of the panel sessions and presentations. Their work resulted in this publication. Jean, Vicki, Robin and Bennett have our sincerest appreciation.

Finally from the University of Michigan, our thanks to Terri LaMarco, Counselor with the U-M Office of Career Planning and Placement and to Sandy Beadle, Administrative Intern with The U-M Center for Continuing E[illegible]ation for Women.

We greatly appreciated having the Waste Systems Institute as a conference patron and all the exhibitors and service donors identified in the following pages. Their support was most welcomed and helped make the conference affordable for the participants.

Of course, we commend the most important group of people -- the speakers who are identified along with biographical sketches in the summary. We value the time and effort they contributed. Their experience, insight and advice presented here demonstrates the strong commitment they have to professional development for the environmental fields.

Besides the speakers, another special group was the conference participants. These college students, recent graduates, faculty, advisors, career changers and others were a main reason for the conference's success. The participants also made essential contributions to this summary through questions they asked in the sessions. We have included a selection of the questions and speaker answers from the sessions.

Turning to our organization, we greatly valued the excellent work of Tom Graske, CEIP Associate, who was involved in all phases of conference planning. He invested the most time of all the staff into the conference and his efforts resulted in success.

A special thank you to Helen Fuertes, Administrative Assistant for CEIP Professional Development Services. She provided all the word processing and proofreading skills necessary for producing this publication.

From The CEIP Fund's headquarters in Boston, we extend our special appreciation to John R. Cook, Jr., founder and President of CEIP. His insight, encouragement and enthusiasm led to our organization's development of environmental career conferences. We also would like to recognize Edward Becker, CEIP's Director of Operations and Jacqueline Steinberg,

CEIP's Business Manager for their advice and work on the conference and this publication.

In closing, we would like to acknowledge the George Gund Foundation, Cleveland, Ohio. Their grant initiated CEIP's Professional Development Services in July, 1986. Thus, they helped provide our capability to organize the conference and produce this summary.

We hope you enjoy this publication which is the result of the work by many people and organizations committed to environmental protection and resource management.

Sincerely,

Lee P. DeAngelis

Lee P. DeAngelis, Director
Professional Development Services
The CEIP Fund, Cleveland, Ohio

CONFERENCE SPONSORS

The CEIP Fund (formerly the Center for Environmental Intern Programs) is a national nonprofit organization based in Boston, MA that has developed over 2,800 environmental positions for college students and recent graduates since 1972. Through five regional "EIP" (Environmental Intern Program) offices covering seventeen states, CEIP serves environmental professionals by recruiting, screening and referring college students and recent graduates for short-term projects. Once a "CEIP Associate" is selected, CEIP administers payroll and related matters and monitors the project. Through its Professional Development Services program, headquartered in Cleveland, CEIP provides career planning programs for students, recent graduates, faculty, advisors and others interested in environmental careers. For more information, please contact The CEIP Fund at 332 The Arcade, Cleveland, Ohio 44114 (216) 861-4424 or -4545. (Also see p. 41)

The University of Michigan School of Natural Resources offers undergraduate and graduate curricula which provide a solid scientific foundation that is a necessary basis for understanding natural and social systems and for using modern tools of planning and decision-making to resolve environmental and resource problems. Graduate specializations include: Resource Ecology, Forest Resource Management, Wildlife Management, Fishery Management, Quantitative Resource Analysis, Remote Sensing, Landscape Architecture, Resource Economics, Resource Policy Analysis, Resource Administration, Environmental Advocacy, Communication and Education, and Resource Institutions and Human Behavior. For more information, please contact the Office of Academic Programs, University of Michigan, School of Natural Resources, Ann Arbor, Michigan (313) 764-0448. (Also see p. 47)

Conference Moderators & Facilitators

(alphabetical order)

John R. Cook, Jr., President, The CEIP Fund, Boston, MA.

Lee DeAngelis, Director, Professional Development Services, The CEIP Fund, Cleveland, OH.

Thomas Graske, Associate, The CEIP Fund, Cleveland, OH.

Sandra Gregerman, Student Services Associate, The University of Michigan, School of Natural Resources, Office of Academic Programs.

Terri LaMarco, Counselor, The University of Michigan, Office of Career Planning & Placement.

Connie Ruth, Placement Coordinator, The University of Michigan, School of Natural Resources, Office of Academic Programs.

CONFERENCE PATRON, EXHIBITORS AND SERVICE DONORS

We are grateful to the following Conference Patron , Conference Exhibitors, and Service Donors who provided financial support for the conference.

CONFERENCE PATRON

The Waste Systems Institute (WSI) is a nonprofit, nongovenmental information, assistance and research center providing programs and services in waste management, toxics and pollution control. WSI is not an advocacy organization, but instead operates from a philosophical approach of neutrality and a high standard of technical accuracy. Founded in 1980, WSI publishes the Michigan Waste Report, the Great Lakes Exchange and sponsors the Great Lakes Regional Waste Exchange, an informational clearinghouse for "waste wanted" and "waste available." In addition, WSI sponsors WASTE-HELP, a free referral service for private and public organizations and individuals seeking environmental assistance. WSI also holds periodic conferences and seminars on related technical issues and is the primary state contractor for the Michigan Small Quantity Hazardous Waste Generator Education and Assistance Program. For more information, please contact the Waste Systems Institute at 470 Market S.W., Suite 100A, Grand Rapids, MI 49503 (616) 451-8992.

CONFERENCE EXHIBITORS

(in alphabetical order)

*Dow Chemical U.S.A.

*Ferris State College --
Environmental Health Program

*Great Lakes Commission

*The University of Michigan --
School of Public Health

Also exhibits by:

*The CEIP Fund --
EIP/Great Lakes

*The University of Michigan --
School of Natural Resources

(Please see next page for SERVICE DONORS)

SERVICE DONORS

The following organizations provided part or all of the travel expenses related to having their staff speak at the conference.

(in alphabetical order)

*ACRT, Inc., Kent, OH

*Christine Branson, Consultant,
Ann Arbor, MI

*Chase Brass & Copper Company,
Cleveland, OH

*Chrysler Corporation, Detroit, MI

*City of Detroit, MI
  -Department of Recreation
  -Department of Water and Sewerage

*Dow Chemical U.S.A., Midland, MI

*East Michigan Environmental Action
Council, Birmingham, MI

*Robert Farrell, Retired Director,
Health, Safety and Environmental
Quality, Standard Oil Company,
Cleveland, OH

*Indiana Department of Environmental
Management, Indianapolis
  -Office of Solid and Hazardous
  Waste Management

*The Joyce Foundation, Chicago, IL

*Mead Corporation, Escanaba, MI

*Michigan Association of
Environmental Professionals,
Lansing, MI

*Michigan Department of Natural
Resources, Lansing
  -Wildlife Division

*Michigan Department of Public
Health, Lansing
  -Center for Environmental
  Health Sciences

*Michigan Great Lakes and Water
Resources Planning Commission,
Lansing

*National Park Service, Porter, IN
  -Indiana Dunes National
  Lakeshore

*The Nature Conservancy,
Lansing, MI

*Resource Recycling Systems, Inc.,
Ann Arbor, MI

*U.S. Environmental Protection
Agency
  -Great Lakes National Program
  Office, Chicago, IL
  -Large Lake Research Station,
  Grosse Ile, MI
  -Office of Public Affairs,
  Region 5, Chicago, IL

*U.S. Peace Corps, Detroit, MI

"Becoming an Environmental Professional -- Strategies for Career Planning"

Saturday, November 8, 1986   Ann Arbor, Michigan

Conference Agenda

A.M.

9:00 - 9:05	**Welcome** James E. Crowfoot, Dean, The University of Michigan, School of Natural Resources, Ann Arbor, MI.
9:00 - 9:10	**Introduction** John R. Cook, Jr., President, The CEIP Fund, Boston, MA.
9:10 - 9:40	**Keynote Address** Craig Kennedy, President, The Joyce Foundation, Chicago.
9:40 - 9:50	**Questions for Mr. Kennedy**
9:50 - 10:00	**Announcements** Lee P. DeAngelis, Director, Professional Development Services, The CEIP Fund, Cleveland.
10:15 - 11:45	**Working for the Environment - Series I**

Environmental Protection Panels

A) Mr. Kent Fuller, Chief, Environmental Planning Staff, U.S. Environmental Protection Agency, Great Lakes National Program Office, Chicago.

Mr. Otto Larsen, Research Scientist, Chrysler Corp., Detroit.

Ms. Mary Ann Heidemann, Executive Director, East Michigan Environmental Action Council, Birmingham, MI.

B) Dr. Roy Kliveter, Chief, Program Relations Division, Center for Environmental Health Sciences, Michigan Department of Public Health, Lansing.

Mr. Charles L. Gray, Head Water Systems Engineer, Water & Sewerage Department, City of Detroit.

Mr. Milan Kluko, Consultant, GBB, Inc., Washington, D.C.*

Resource Management Panels

C) Mr. Ronald Hiebert, Chief, Division of Science, Indiana Dunes National Lakeshore, Porter, IN

Mr. Ermine Venuto, Woodlands Manager, Mead Corporation, Publishing Paper Division, Escanaba, MI

Ms. Judith Stockdale, Director of Special Projects, Open Lands Project, Chicago

D) Ms. Sylvia Taylor, District Wildlife Supervisor, Mio District Headquarters, Michigan Department of Natural Resources, Mio, MI

Ms. Elizabeth Buchanan, Ph.D., Manager of Special Projects, ACRT, Inc., Kent, OH

Mr. Carl Oates, Associate Landscape Architect, Recreation Department, City of Detroit.

P.M.

12:00 - 12:30
and repeat at
12:45 - 1:15 Mini-Sessions

1. Environmental Work Opportunities Through EIP (formerly Environmental Internship Program)
John R. Cook, Jr., President, The CEIP Fund, Boston.

2. Undergraduate and Graduate Programs at The University of Michigan School of Natural Resources
Connie Ruth, Placement Coordinator, and Sandra Gregerman, Student Services Associate, The University of Michigan, School of Natural Resources, Office of Academic Programs.

3. Resources for the Environmental Job Search
Lee DeAngelis, Director, Professional Development Services, The CEIP Fund, Cleveland.

4. Environmental Work Opportunities Overseas with the Peace Corps
Ms. Kathleen Gamble, Area Representative, U.S. Peace Corps, Detroit

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* Due to a last minute change in his schedule, Mr. Kluko was unable to attend the conference. However, he did submit a text of what he was to present.

5. National and Michigan Associations of Environmental Professionals

Ms. Marcella Colling, President, Michigan Association of Environmental Professionals (MAEP) and Harriet Greenwood, Past President and Board member, MAEP.

1:30 - 3:00 Working for the Environment - Series II

Environmental Protection Panels

A) Mr. James Hunt, Chief of Compliance Monitoring Section, Hazardous Wastes Program, Indiana Department of Environmental Management, Indianapolis.

Mr. J. Michael Rio, Manager of Environmental Services, Dow Chemical, USA, Midland, MI

Mr. Roger Westman, Air Pollution Control Manager, Allegheny County Health Department, Pittsburg

B) Mr. William Richardson, Chief of Large Lake Research Station, U.S. Environmental Protection Agency, Grosse Ile, MI

Mr. Ralph Feeney, Regulatory Analyst, Amoco Corporation, Chicago

Mr. Robert Staib, Education Director, Council on Hazardous Materials, Cleveland

Resource Management Panels

C) Mr. James Bernard, Assistant Director, Michigan Great Lakes and Water Resources Planning Commission, Lansing

Christine Branson, Consultant, Ann Arbor, MI

Mr. Harry Conard, Manager of Planning & Policy Development, Department of Community Development, City of Cleveland

D) Mr. Adrian Achtermann, District Conservationist, Summit Soil & Water Conservation District, Cuyahoga Falls, OH

Mr. Jonathan Dreyfuss, Senior Analyst, Resource Recycling Systems, Inc., Ann Arbor, MI

Mr. Thomas Woiwode, State Director (Michigan), The Nature Conservancy, Lansing

3:15 - 4:00 Advice on Finding Your First Permanent Position as an Environmental Professional

1) Ms. Anne Rowan, Public Affairs Specialist, Office of Public Affairs, U.S. Environmental Protection Agency, Region 5, Chicago

2) Ms. Sharon Edgar, Environmental Scientist II, Ohio Environmental Protection Agency, Columbus

3) Ms. Elaine Price, Environmental Coordinator, Chase Brass & Copper Company, Cleveland

3:15 - 4:00 Special Presentation and Discussion

Mr. Robert Farrell, Retired Director, Health, Safety & Environmental Quality, Standard Oil Company, Cleveland

4:15 - 5:00 Sharing Resources and Strategies

1) Environmental Protection --- Corporations

Mr. Lee DeAngelis, Director, Professional Development Services, The CEIP Fund, Cleveland

2) Resource Management --- Corporations

Ms. Terri LaMarco, Counselor, University of Michigan, Career Planning and Placement

3) Environmental Protection --- Government

Mr. Thomas Graske, Associate, Professional Development Services, The CEIP Fund, Cleveland

4) Resource Management --- Government

Ms. Connie Ruth, Placement Coordinator University of Michigan, School of Natural Resources

5) Non-Profit Organizations

Ms. Sandra Gregerman, Student Services Associate, University of Michigan, School of Natural Resources

Keynote Address

Craig Kennedy, President, The Joyce Foundation, Chicago

Mr. Kennedy became President of The Joyce Foundation in May, 1986. He joined the Foundation in 1980 as a program officer and was closely involved in the development of the Foundation's conservation and economic development programs. He became Vice President for Programs and Planning in 1984. Before joining the Foundation's staff, he worked as a consultant, researcher and college instructor.

Mr. Kennedy earned his professional degrees from The University of Chicago Graduate School of Business and School of Social Service Administration. He is a director and vice chair of the Donors Forum of Chicago and a member of its executive committee.

The Joyce Foundation awards grants primarily in the fields of conservation, culture, economic development, education, government and health. Preference is given to nonprofit organizations having a base or program in the Midwest. This region includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin. A limited number of conservation grants are made in the states of North and South Dakota, Kansas and Nebraska. On rare occasions, the Foundation moves beyond the region for projects of special interests or merit.

In 1982, the Foundation made a ten-year $20 million commitment to the support of conservation of midwestern resources. After four years, over $10.5 million has been allocated to a wide range of projects related to three priorities -- groundwater protection, soil conservation and the Great Lakes. In all three areas, preference is given to public education and policy research efforts that address statewide or regional issues.

Of the $8.28 million distributed in grants in 1985, $1.98 million went toward conservation projects with over sixty organizations, including the Center for the Great Lakes, Conservation Foundation, Environmental Defense Fund, Iowa Natural Heritage Foundation, Missouri Botanical Garden, Natural Resources Defense Council, Ohio Environmental Council and the West Michigan Environmental Action Council Education Foundation.

Highlights

Based on his observations as President of a major foundation supporting environmental projects, Mr. Kennedy said the challenges in the environmental arena are more complex than in the past. As a result, there is a need for environmental professionals to be interdisciplinary and avoid "professionalization" or the isolation of a narrow discipline.

He urged participants to be professional through demonstrating competence, courtesy, integrity and responsibility. Mr. Kennedy outlined suggestions for how to avoid professionalization and become interdisciplinary. These include learning to borrow expertise from other fields, understanding what people from other fields say, and incorporate this information in your analyses. He said you need to resist the "pigeon holes of professionalization" and have a willingness to "listen and learn across professional borders".

Mr. Kennedy concluded by saying many of the conference speakers were examples of professionals who avoided professionalization and became interdisciplinary to meet complex environmental challenges. He urged participants to listen and learn from the speakers.

Summary of Mr. Kennedy's Address

Mr. Kennedy began by saying it was a great honor to address the conference because of the opportunity to meet future leaders in the important fields of environmental protection and resource management. He also cited his admiration for the work of The CEIP Fund and its president, John R. Cook, Jr.

Although he was honored to be asked to speak at the event, Mr. Kennedy said he was a little puzzled since he is not an environmental professional, nor did he have training in any environmental field. However, he described the experience he has gained on the issues through his work with the Joyce Foundation which is a major regional funder of environmental projects especially related to groundwater protection, the Great Lakes and soil conservation.

Mr. Kennedy said that his work on the "periphery" of the environmental fields has given him an excellent vantage point. By being an outsider, he is not affected by internal cultures of particular disciplines. There is an opportunity to see many different problems and actors. Mr. Kennedy stated that if he does his job well, he has a sense of the "big picture" on environmental issues and the professionals in the fields.

Mr. Kennedy stressed that he had one simple, but important message for conference participants. He urged them to be professional as they develop their careers, but to avoid "professionalization". "Learn your field, but don't be devoured by it," Mr. Kennedy emphasized.

Before expanding on his main message, Mr. Kennedy discussed another key point -- The world is becoming more complex or at least the problems posed by the natural and man-made worlds present us with greater complexities than ever before. In the environmental arena, this point is especially true. Mr. Kennedy illustrated the following examples:

* The scientific challenge of understanding "holes" in the atmosphere (i.e. ozone layer) and the dynamics of atmospheric pollution.
* The technological challenge of devising safe means for disposing of undisposable materials.
* The public policy and management problems of siting new facilities and of dealing with international resources.
* The public health challenge of doing the epidemiological research necessary for assessments of environmental risks.
* The legal challenge of devising and implementing laws to control pollutants that cannot be seen and cannot be easily traced.

Mr. Kennedy went on to explain that solving environmental problems has never been easy, however, in the 1960's the challenges were clearer. For example, in those days, the major issue was often raw waste from factories or cities that were being dumped into lakes and streams. You could see and smell the pollution, you could trace its source and you could devise fairly straightforward controls.

Today, environmental problems are not that clear. Mr. Kennedy highlighted the following examples of greater complexities:

- Invisible atmospheric pollutants of unknown risk from unknown sources.
- The dilemmas faced in introducing new, genetically engineered organisms into the environment for field tests.
- The conflicts that surround nuclear energy and its economic, health, environmental and moral implications.
- The management difficulty of simply handling the wastes of modern society. For example, all kinds of complex issues arise with the siting of a new waste landfill.

Mr. Kennedy returned to his main message by asking what do the challenges of complex environmental problems have to do with "Professionalism, but not professionalization?" He first defined "professionalism" as a code of conduct involving competency, courtesy, integrity and a sense of responsibility. Professionals have an obligation to do a good job and be willing to do the work that professional standards demand. Unfortunately, Mr. Kennedy said, these values are not common anymore. He emphasized that you can go a long way by being a decent and committed person with an acceptable level of ability.

Turning to "professionalization", Mr. Kennedy outlined his definition of the term and why professionals should avoid this "modern plague." He began by saying that professions are usually created when barriers are raised so that only certain people can make claims to specific kinds of expertise and apply these skills. Formal barriers include licenses, while informal barriers could be professional cultures.

Professions not only keep people out, Mr. Kennedy stressed, they also keep people in and prevent knowledge gathering in other fields. Examples of this include the practice of tenure in certain professions or the pressure to concentrate on a small part of the field. Unfortunately, this type of professionalization is encouraged by complexity. As knowledge expands and the need to understand other fields increases, there is a narrowing of interests. Professionals tend to learn a special discipline, occupy it against "invaders" from other disciplines and never venture from their profession's "fortress". Mr. Kennedy said you only have to look at the areas of chemistry, biology or law to find examples of professionalization through the narrowing of interests.

Mr. Kennedy went on to discuss how professionalization is the opposite of what is needed to deal with the environmental challenges. He stated that complexity breeds specialization, yet to solve complex problems you need to cross specialties. Mr. Kennedy gave the example of acid rain. Scientists, engineers, and politicians need to work together to solve this issue. Nuclear power is another difficult environmental challenge that requires many specialties. He emphasized that the solution to almost every major environmental problem will not only require interdisciplinary collaboration but also people, professionals, who can think interdisciplinary and work in different fields.

Based on his experience as an informed observer of the environmental fields, Mr. Kennedy said there are not many environmental professionals who have interdisciplinary skills and abilities. He said there are very few economists who understand the technology of waste disposal; very few chemists and microbiologists who can work well with lawyers and public officials; and very few doctors or public health experts who want or feel a need to work with anyone else. Mr. Kennedy emphasized that the lack of people with interdisciplinary skills or the ability to work and think across professional boundaries is one of the great problems facing us as we try to deal with complex environmental issues.

This need for the interdisciplinary or "wholistic" approach has often been preached, said Mr. Kennedy, but it is rarely implemented. There is resistance by professions and it is difficult to cure professionalization. He said there is hope as professionals attempt to cross specialities. Mr. Kennedy gave the example of The Joyce Foundation's work with the Santa Fe Institute which is trying to address complex issues and train graduate students to be interdisciplinary.

Mr. Kennedy summarized his comments with specific advice to the conference participants as they chart their career path. First, he said, you have to think about what you need to be interdisciplinary. You need the skill to borrow expertise from other fields, the skill to understand what people from other fields are saying and the skill to incorporate this information into your analyses. Mr. Kennedy said you learn these skills by being curious. He suggested taking some "unusual" classes in related fields and using services like the Environmental Intern Program of The CEIP Fund to work in jobs unlike those that you will have when you leave school. When searching for a first job, Mr. Kennedy recommended being willing to take some risks and seek those positions that give broad experience.

Mr. Kennedy cautioned that following his advice would not necessarily lead to "interdisciplinary bliss" or an ability to see the whole. "A lot depends on you." He said you need the will to resist the "pigeon holes of professionalization" and a willingness to learn and listen across "professional borders."

Fortunately, Mr. Kennedy said, many of the speakers at the conference were examples of professionals who have avoided professionalization and became interdisciplinary to meet complex environmental challenges. He urged participants to listen and learn from the speakers for they could give valuable advice to build upon his ideas and recommendations.

Questions and Answers

Mr. Kennedy fielded a variety of general and specific questions. For example, he was asked how to balance the need to be wholistic with the specifics of job hunting. He replied that you need to have some connection to one field or specialty. However, you should look beyond that field's boundaries for positions. You may be able to find generalist or wholistic type positions which require your field as a knowledge base. Mr. Kennedy said the nonprofit sector offered these kinds of opportunities.

Another question related to job openings with The Joyce Foundation and organizations like it. Mr. Kennedy began by saying that foundations have small staffs. When they look for people, they advertise primarily through the organizations they fund as well as colleges and universities. He said foundations look for people with knowledge in one field who also understand other areas. They require those who have interdisciplinary approaches because the projects foundations consider for funding are usually designed to help solve complex problems and require the interaction of a variety of professionals.

Mr. Kennedy was also asked where one could find employment dealing with changing public policy. He said state, county and local governments would be good places to consider. They often have interesting and challenging jobs related to solving environmental problems through policy initiatives.

In addition, Mr. Kennedy was asked how The Joyce Foundation was started. He replied that the founder was Beatrice Joyce Kean whose family had built a fortune from primarily the lumber business in the Great Lakes region. She left the bulk of her estate to the foundation upon her death in 1972.

WORKING FOR THE ENVIRONMENT - SERIES I

This was the first series of four concurrent panel sessions -- two featuring speakers from environmental protection fields and two from resource management areas. Each panel included a moderator and three speakers. The ninety minute (10:15 - 11:45 a.m.) sessions were designed for each speaker to give a twenty minute presentation followed by a twenty-five to thirty minute question and answer period.

Each speaker was asked to address the following three areas:

1. The role of the environmental professional in your organization.
2. The environmental issues you see as important now and in the future and the challenges they present for an organization like yours.
3. Advice for the college student or recent graduate who wants to work on environmental affairs for an organization like yours.

In arranging the panels, environmental protection was defined as work related to air quality, water quality, solid waste management, hazardous waste management and environmental health. Resource management was defined as work related to fisheries, forestry, wildlife, land and water conservation, parks and recreation, urban and regional planning.

This series of panels was coordinated with the afternoon series to allow participants exposure to a diversity of speakers or to enable them to concentrate on speakers from a particular sector (e.g. corporate, government, nonprofit).

Working for the Environment - Series I

A. Environmental Protection

Moderator - Terri LaMarco, University of Michigan

Mr. Kent Fuller, Chief, Environmental Planning Staff, Great Lakes National Program Office, U.S. Environmental Protection Agency, Region 5, Chicago

Mr. Fuller's staff oversees the Great Lakes water quality agreement between the U.S. and Canada. They work with states on pollution control plans, especially those elements related to the Great Lakes. In addition, his office assists states in preparing plans to clean up the Great Lakes.

He has been with the U.S. EPA for twelve years. Prior positions include Chief of Planning for the EPA Region 5 Water Division. Mr. Fuller has a B.S. in forest management from Pennsylvania State University and a M.S. in natural resource management. He is also a member of the Planning Comission, Village of Glenview, IL.

Ms. Mary Ann Heidemann, Executive Director, East Michigan Environmental Action Council

Ms. Heidemann directs and administers this nonprofit organization's programs and works with a diverse group of volunteers and professional staff. Her background has included writing environmental impact statements for the Wisconsin Dept. of Natural Resources and the Wisconsin Dept. of Transportation, and working for the U.S. EPA and private consulting firms.

Ms. Heidemann is currently a Ph.D. candidate at the University of Wisconsin/Madison in the area of land resources. Her graduate level work was done at the University of Pennsylvania in regional planning and public administration.

Mr. Otto Larsen, Research Scientist, Chrysler Corporation, Detroit

Mr. Larsen is responsible for air pollution testing. In addition to operating stationary monitoring equipment to measure total suspended particulate matter, carbon monoxide, carbon dioxide, odors and organics, he runs a mobile laboratory for gas testing. He also writes most of his office's computer programs. Mr. Larsen has been with Chrysler for over thirteen years. He has a B.S. in chemistry from the University of Montana and did some graduate work in chemistry at Wayne State University. He is an active member of the Air Pollution Research Advisory Committee, which funds basic research at universities. It is the research arm of the Automobile Manufacturers Association and the American Petroleum Institute.

Highlights

This panel on environmental protection began with an introduction of the panelists by Moderator Terri LaMarco. Speakers Kent Fuller, Otto Larsen, and Mary Ann Heidemann, represented government, private industry, and the nonprofit sector, respectively. Although each position casts a different perspective on environmental careers, the three speakers had much experience in common because of their diverse employment backgrounds, which included experience for each in both public and private sectors.

Several themes were obvious throughout the session. The most emphasized of these was that there is no one guaranteed path to a successful career as an environmental professional. Each of the panelists took a different route, and appeared satisfied with the outcome. Whichever path is chosen, the most critical point to remember is that it is a completely individual choice, and there is no formula for success.

Although this may sound disappointing, there is a positive aspect. The lack of a traditional path to success also means that there is a large amount of flexibility in deciding how to approach an environmental career. Important suggestions to aid in preparation for that first position from each panelist had common elements. Keep options open, or possibilities may be too narrow. Make connections as early as possible, whether through school, volunteer work, or other areas. Get experience wherever it is offered; volunteer positions can be valuable opportunities for this. An educational background in physics and chemistry can be helpful for technical employment. Above all, people who wish to begin an environmental career in any area should have realistic expectations regarding their qualifications, salary size and limitations in terms of professional fulfillment.

Environmental issues cited as requiring attention currently and in the future were groundwater monitoring, a more systematic and global approach to pollution, the recycling of chemical waste and development of cooperation among traditionally opposing sides to resolve environmental issues. New problems are arising constantly, as are new possible solutions, making this field an exciting and demanding one. The biggest threat to it is a stagnation of ideas and a loss of innovative approaches to solutions.

It is because of its dynamic nature that the speakers emphasized that there is a huge variety of employment opportunities through the diversity of issues being addressed. Each of them expressed the belief that there will be a continuing need for environmental professionals in public, private, and nonprofit sectors. Constant change and restructuring of environmental goals add to the challenges posed to the future professional.

Presentations

The first speaker, Mr. Kent Fuller, began by introducing himself and explaining his role as Chief of the Environmental Planning Staff for the Great Lakes National Program Office of the U.S. Environmental Protection Agency in Chicago, Illinois. He and his staff are assigned to monitor the Great Lakes water quality agreement between the United States and Canada. This includes cooperative plans to control pollutants entering the Great Lakes from either country.

Mr. Fuller described much of his work at the E.P.A. as being involved in "the care and feeding of a statute". Once policy has been decided in Washington, the focus of the E.P.A. is enforcement of that policy. However, because of the interrelatedness of our environmental resources, he believes that statutes must be viewed with the same integration. In monitoring the Great Lakes, Mr. Fuller's staff looks at them as a resource within the total environment. This, he says, is atypical of many E.P.A. offices, who focus on specific statutes. Historically, pollution legislation has developed in answer to specific crises. Air and water pollution statutes are two examples of legislation which arose in direct response to environmental catastrophes. It is this specificity which has caused the agency's restricted enforcement of each statute. Mr. Fuller expressed his hope that the E.P.A. would evolve into a more environment-oriented versus statute-oriented agency. He based this wish on the fact that pollution in one form often affects other areas. Non-point sources in urban areas affecting water quality and air pollution settling in water bodies resulting in high toxin levels in fish were two examples cited.

The future will be challenging for environmental professionals. The trend toward a more holistic approach in solving environmental problems will create the need for innovative thinking and cooperation among different interests. Two recent developments are heightened attention to groundwater (both supply and contamination) and the use of biomonitoring. Groundwater legislation and subsequent monitoring and enforcement are forthcoming, Fuller feels. The use of biological indicators as a method of monitoring problems in an ecological system is another recent and not yet fully utilized technique. Projections for the future also include a completely integrated approach to regulation enforcement.

Another problem yet to be resolved is that of non-point source pollution. Presently there is no effective monitoring because of the elusiveness of the pollution. Land run-off, household chemicals, etc. all contribute to the contamination of our resources and do not lend themselves to straightforward regulation.

Just as the issues are changing, so are the policies for hiring people to address them. In the past, government employees were not performance-oriented. Once one became a government employee, he merely had to remain in order to advance. Today, the emphasis is on performance. Within the E.P.A., there are two possible paths for employment -- technical and managerial. In the technical arena, options are limited and advancement extends to the GS 14 level (Salary range of $ 44,430 to $57,759), as a national expert. A more flexible route can be taken as a supervisor or manager, where the responsibilities focus on managerial skills, rather than on technical expertise. Mr. Fuller emphasized the need for a strong background in organic chemistry and other technical subjects, because he feels employment will center around toxics related issues in the future. Other helpful skills such as managerial experience are important for future resource professionals if they are seeking employment in the federal government.

Ms. Mary Ann Heidemann, Executive Director of the East Michigan Environmental Action Council, brought a different perspective to the discussion. Her current position with a nonprofit organization came after several job changes. She feels that working for local, state and federal governments, as well as for a private consulting firm before her present job has given her a cross- disciplinary look at the environmental field.

Nonprofit work requires dedication and the realization that salaries will not necessarily be competitive with private industry. However, the experience received may be invaluable and there are always tasks to be done. Another advantage is the opportunity to meet many other professionals and nonprofessionals who share common ideas. A position in a nonprofit organization usually means flexibility in assessing a project and in defining the methods used to complete it. Ms. Heidemann expressed her belief that there is a definite need for nonprofit organizations like hers because of their unique position in the environmental community. They represent a third voice, one which is highly informed and can interpret what is happening during the interplay between private industry and government. They may represent public opinion or special interests, but in either case, they serve to keep the public aware of developing issues. Ms. Heidemann believes that specific issues concerning hazardous waste and habitat preservation are some of the topics in the immediate future of the environmental professional. Research into possibilities such as the recycling of toxics for use in other processes, a change in product manufacturing to eliminate the need for certain chemicals which produce toxic waste and the possible substitution of one less ecologically harmful product for another will be stimulating and challenging. Another challenge is to improve how we do cost-benefit analysis. Finally, in the area of species and habitat protection, a more global view is in order regarding toxic contamination and habitat destruction.

Because of the present and future need for environmental professionals to address these and other problems, Ms. Heidemann sees the possibility of employment not limited to nonprofit areas; each sector has certain benefits. Experience in local government allows one to acquire responsibility and recognition early, while being exposed to a wide variety of experiences. Other advantages include an understanding of government procedures and the opportunity for hands-on training not available in larger organizational settings. A low entry-level position is the main disadvantage. Working in a state government allows flexibility of hours and in many instances, the chance to further formal education. Problems such as a large turnover with the accumulation of experience and the possibility of a difficult adjustment if past employment has been in the private sector are also considerations. Consulting firms are other options. These offer the chance to work with private industry and government clients.

Success in entering any one of these areas depends on several things. Ms. Heidemann feels that a strong educational background, combined with experience in the field is a powerful combination. She suggests that developing contacts during school, and spending time in volunteer work as two important ways to gain exposure before seeking employment in a chosen area. Volunteers are often offered paying jobs in steady financial times. By investing time in nontraditional positions, one is able to practice some of the skills learned in school, and opportunities may arise in more traditional areas. Be willing to take risks; sometimes they present unforeseen rewards.

The third speaker, Mr. Otto Larsen, brought the perspective of private industry to the session. He is currently employed as a research chemist for the Chrysler Corporation in Detroit. His first message was that private industry is not "the bad guy". Large, reputable companies like Chrysler want to obey regulations, if only to avoid fines and other negative enforcement actions. They employ skeleton staffs to monitor pollution in daily operations. When they do neglect their environmental responsibilities, interest groups and government regulators keep them in line. Corporations want to maximize profits and adhere to regulations, while maintaining a positive corporate image. Many times these objectives directly oppose each other, and that is the time when strict enforcement is necessary. Monitoring and pollution control devices are expensive to maintain in operating budgets, and not surprisingly, industry rarely exceeds its requirements in either. This, combined with changing regulations on operating procedures which in the past were legal, has resulted in such problems as improper hazardous waste disposal. It now poses health and contamination problems, and has resulted in negative images for many industries.

Mr. Larsen described typical positions available in the automotive industry to environmental professionals. Industrial hygiene is one area where enforcement of OSHA (Occupational Safety and Health Act) is the primary concern. Other possibilities are positions in the legal department, work with regulation of tailpipe emissions, and monitoring factory emissions, which is Mr. Larsen's area of expertise. His position involves inspection of smokestack emissions and control of a small staff (one full time professional and 3-5 temporary employees). As an inspector, Mr. Larsen continually monitors factory smokestacks and reports any violations of air pollution regulations to each factory for correction. His findings also go to regulatory agencies, which in the event of continually uncorrected infractions, will penalize the factory. These penalties are supposed to be avoided by heeding the inspector's report. The job of a stack sampler is not a glamorous one. It involves climbing the stacks and hand recording particulate, odor, and various emission levels daily. Mr. Larsen expressed his satisfaction with his job, but acknowledged that it wasn't for everyone.

His advice to future professionals interested in private industry was straightforward. It is important to understand that corporations always try to keep operating costs low. This means that funds for regulation and enforcement of pollution and health standards will always be minimized. Staffing, if any, will be small, and many times this means extra work for a few. To minimize expense, many companies use consulting firms rather than hire a full time staff. Therefore, becoming a full-time environmental professional can be difficult, and to be successful, one needs as many competitive advantages as possible. In Mr. Larsen's opinion, this includes a strong background in chemistry, computers, and physics. Other attributes include a willingness to work fast and accurately, realistic expectations and physical strength (required for certain types of testing).

A valuable aid to pre-professionals in gaining knowledge and experience is EIP (or the Environmental Internship Program) or similar intern or cooperative education positions. Chrysler regularly uses EIP Associates for temporary assignments. Mr. Larsen relies on them in his department every year to augment his staff while remaining within budget constraints, and he feels that in return, the young people receive a great deal of experience in a short period of time.

Questions and Answers

The question and answer period covered a variety of topics from specific questions regarding pollution control to questions focusing on employment opportunities and ethics.

Regarding pollution, one question posed related to Ms. Heidemann's statement about recycling hazardous chemicals in an effort to "complete the cycle." Who is currently involved in such efforts? At present, she stated we are still working with waste after pollution has occurred. To be successful, we must employ other manufacturing strategies to reduce waste. Mr. Larsen added that sometimes less stringent laws allow for easier compliance. He cited solvent burning as an example. If a 99.00% destruction efficiency rate is employed instead of a 99.99% rate, burning is easier and less expensive.

Questions to Mr. Larsen regarding pollution included the issue of classification of waste motor oil as hazardous waste in the future, and his opinion on air and water quality testing. While he couldn't make an official prediction, he expressed a personal desire to see regulation of waste motor oil in the near future. Regarding resource monitoring, he commented that water quality testing is easier than measuring for air quality. Thus, water quality work is more attractive to consultants.

Questions related to employment ranged from appropriate attire to the possibility of entry level positions in government and private industry. Mr. Fuller suggested consulting firms as a good place to start with little experience. In industry, hiring usually depends on the stringency of current regulations. The more monitoring necessary, the more available positions there are. An effective entry approach, according to Mr. Larsen, is to start with a state agency. Civil Service exams may be necessary for entry into government, and can be helpful in getting offered an interview, if the score is high. State governments offer a wider range of experience for the new professional than does federal government, and this should be kept in mind.

Working for the Environment - Series I

B. Environmental Protection

Moderator - Lee DeAngelis, The CEIP Fund

Dr. Roy Kliveter, Chief, Program Relations Division, Center for Environmental Health Sciences, Michigan Department of Public Health, Lansing

Dr. Kliveter is in charge of the Center's information and community outreach programs and serves as a liason with other governmental agencies on issues related to the prevention and control of human exposure to toxic substances. His duties include the operation of a toll-free, statewide toxics and health hotline and advisory service. Dr. Kliveter is currently involved in studying the role of state and local government in regulating the potential impacts of the biotechnology industry. He also is on a statewide task force on Vietnam veterans' exposure to Agent Orange.

Dr. Kliveter has a B.A. in biology and chemistry from St. Olaf's College (MN) and a Ph.D. in microbiology from the University of Minnesota. He is a member of the American Association for the Advancement of Science, American Society of Microbiology and the Michigan Environmental Health Association.

Mr. Milan Kluko, Consultant, GBB, Inc., Washington, DC *

Mr. Kluko is experienced in solid waste management and planning and has worked on land use, hydrologic and solid waste feasibility studies at state, county and local levels. Previously, he was president of a consulting firm specializing in planning and environmental analysis.

Mr. Kluko earned a B.A. in physical geography and resource management at the University of Illinois/Chicago and was an Associate with EIP/Great Lakes. His professional affiliations include American Association for the Advancement of Science, American Planing Association and the American Association of Geographers.

Mr. Charles Gray, Head Water Systems Engineer, Department of Water and Sewerage, City of Detroit

Mr. Gray is responsible for the development of training programs, personnel administration, project monitoring, budgets, computer management and advance planning of capital projects. His past positions include design engineer for the City of Detroit and is a retired Commander in the U.S. Naval Reserve.

He has a B.S. in civil engineering at Wayne State University. Mr. Gray is treasurer of the Rouge River Watershed Council, member of the Water Pollution Control Federation and active in the Detroit Area Pre-College Engineering Program.

* Due to a last minute change in his schedule, Mr. Kluko was unable to attend the Conference. However, he did submit a text of what he was to present. An edited version of this is included.

Highlights

A professional with many years of service as an environmental engineer with local government, Charles Gray stressed the importance of learning engineering fundamentals like drafting, mathematics, computer modeling and programming, hydraulics, structures and fluid mechanics. To work in water supply systems and wastewater treatment, microbiology, bacteriology and analytical chemistry are also important. He emphasized communication skills, especially writing, to be a successful professional. In his presentation, Mr. Gray illustrated the challenges environmental engineers and other professionals have faced and will need to address especially in wastewater treatment.

Dr. Roy Kliveter, an environmental health professional with a state agency, advised that to be an effective problem solver you need to research issues, educate and inform the public, know the laws and rules for implementation and be able to interact with a variety of people and organizations. He identified the challenges in the environmental health area, which include unanticipated toxic effects of products, setting standards, risk assessment and public health education. Dr. Kliveter stressed that if you make a goal to do your best, not as a function of salary or benefits but as a personal goal, you can achieve satisfaction from your job. This will help when you start to encounter the unavoidable frustrations and aggravations of holding down a job.

The third speaker, Milan Kluko, illustrated the variety of tasks he currently performs with an environmental consulting firm. Because of all the roles you are asked to play with a consulting firm, Mr. Kluko stressed it is important to have basic skills in: (1) Research, because all assignments involve data collection; (2) Computers, since everything is done on computers; (3) Writing, in order to translate data and ideas into text under a deadline; (4) Management and Planning, for working efficiently under pressure; and (5) Communication which is necessary to present your reports and analyses to clients in an understandable manner.

Presentations

The first speaker, Charles Gray, began by saying he was going to focus mainly on environmental engineering with the City of Detroit, Department of Water and Sewerage. He said when he was hired, the term was "sanitary engineering," but since then the field has broadened. All branches of engineering in the department are involved in some way with the environment, from chemical engineers working on the processes of water treatment and waste water treatment to construction engineers involved with a pipeline job concerned with stream crossings and soil erosion.

Mr. Gray stated that The City of Detroit does not hire environmental engineers per se, they hire civil engineers and because of that use of the classification it is expected that those hired will be able to deal with all aspects of civil engineering. That covers areas such as sewer design, water main design, structural design, water supply and waste water processes. To be called a "professional" in engineering, one must be registered with the state and must take board exams just like doctors or attorneys.

Engineers are not the only category in the Water and Sewerage Department that are environmentally oriented. Mr. Gray said there are also microbiologists, analytical chemists, and general chemists. These professionals are involved with the water supply system. The department manages five water plants for the City of Detroit and the surrounding 104 communities. This service area includes seven counties and over half of the state's population.

Mr. Gray went on to outline the history of the department to illustrate the scope of the Department of Water and Sewerage. He said the department started in 1836 following citizen complaints about the stench from an open creek that ran through the center of the city. It designed and constructed Detroit's first sewer, known as the Grand Sewer, which was about a mile and a quarter long. It was the first combined sewer (waste and storm), a type of system still in use in Detroit.

In 1853, the state legislature created a Board of Water Commissioners for the city of Detroit to take over the job of water supply from several small private firms. They built a pump station, created a reservoir and began installing pipes with spigots for distribution of water. The only treatment at that time was filtration and sedimentation.

In 1909, The International Joint Commission was formed by treaty between the U.S. and Canada to affect water operations within ten Great Lakes states and the Province of Ontario. Its job was to investigate and control the pollution in the Great Lakes. Studies were undertaken at that time which involved the department and the City of Detroit. In 1915, with the auto industry booming in Detroit, the IJC made recommendations for sewage treatment. By now Detroit had about 500 miles of combined sewers, all of which dumped raw sewage into the Detroit River. In 1917, the Water Commission started clorination of its water source, but it was not until 1935 that construction was started on the first sewage treatment plant. This was a primary treatment plant using chlorination with discharge through a tunnel into the middle of the Detroit River. The department was providing sewage disposal at that time for Detroit, most of Eastern Wayne County, and parts of Macomb County.

Since 1966, the department has been upgrading this sewage treatment plant to secondary treatment and has instituted other processes at the plant. They now incinerate sludge and are adding another pump station to handle suburban flow. The plant is presently rated at 805 million gallons per day by the U.S. EPA, but they hope to raise that with the construction of the new pump station and its peripheral facilities.

Mr. Gray stressed that there is still a major problem troubling the Detroit area that will not be solved even when the new waste water facilities are completed. The problem is known as CSO - combined sewer overflow. Detroit has 84 combined sewer overflow points, leading to the Detroit or Rouge Rivers. Back one hundred years ago, the Rouge River was a place to fish, swim, picnic and enjoy. Today the greater portion of it is oily, smelly and unfit to use. A lot of this is due to CSO. The Rouge River Council was formed to address the problem and develop a plan for the rehabilitation of the river. The Council is comprised of representatives from bordering communities, the state and Wayne and Oakland counties. They are developing a 20 year planning strategy for projects that can be begun today.

The State of Michigan is also beginning to develop long term management and development strategies, especially in watershed areas. There are also non-point pollution problems that may take even longer to solve. The state is in the process of hiring environmental professionals and assistants to begin working on these projects. There is going to be a need for environmental engineers in planning, design, overseeing construction and preventing additional abuse of our rivers.

Mr. Gray next gave some suggestions for students and recent graduates interested in environmental engineering. He said graduation does not mark the end of your education. Accepting a job is not just a chance to use what you have learned, but to begin again to learn more. Your employer, your supervisor and your co-workers have been in this "school" longer than you have, so remember to treat them with some respect for their experience. If you irritate your boss with an "I know it all" attitude, your job effectiveness will be greatly reduced. He cautioned not to expect a private office your first day on the job. For a new engineer, the beginning is usually at a drafting desk. Experience and practice are what make you more knowledgeable and competent, so be patient. Mr. Gray said to be sure to learn the fundamental skills of your chosen field. You cannot be an effective environmental engineer, or expect advancement, if you do not have drafting skills or the ability to read a set of blueprints.

Another essential skill is writing, stated Mr. Gray. "The command of written language is essential." Whether it is for writing an environmental impact statement, a set of specifications, or a letter to a city council member, you must have your language capabilities. Another aspect is to know to whom you are writing. Use technical language for those who will understand it, but do not use this language if it will not help to get your point across.

Mr. Gray said there are many courses which can be useful to the person interested in environmental engineering. Although computers do much of the work, one should still have a solid foundation in math. Computer modeling and program development are becoming increasingly important. Hydraulics and fluid mechanics are also essential. In water and wastewater treatment, you should include microbiology, bacteriology, and analytical chemistry. In addition, you should have some courses in structural engineering, preferably reinforced concrete.

Finally, Mr. Gray advised that if you are looking for a career to make you rich, do not look to local government. However, positions with these agencies are high on job security and have good health plans and pensions. One thing that applies anywhere you work, Mr. Gray emphasized, is dedication. "You are going to run into obstacles and frustration, but you need the dedication to stay there and fight it out."

Dr. Roy Kliveter, the second speaker, opened by describing the Center for Environmental Health Sciences which is in the Michigan Dept. of Public Health. It functions as an advisory group within the department to the regulatory divisions such as water supply, occupational health and radiological health. The Center has three divisions: Program Relations, Epidemiological Studies, and Toxicology. Program Relations is an information branch whereas the other two divisions are more of an investigative branch.

The entire effort of the Center for Environmental Health Sciences, said Dr. Kliveter, is directed at reducing or preventing human exposure to toxic substances. This includes informational development and investigative work as problems arise. They often are involved with substances that are not yet regulated in any formal way, so the work often begins with risk assessment.

Dr. Kliveter cited that some of the broader health issues faced today are related to the threat and costs of chronic disease, especially those associated with occupational illness. Traditional medical and public health intervention can accomplish only a limited reduction in these diseases. To reduce the personal, financial and societal burden of these diseases, work is needed to change the habits that promote their development and reduce the situations allowing exposure to toxic substances that cause illness. Environmental and occupational exposure to toxic substances are considered two major health factors in the incidence of chronic disease. Thus, these exposures must be reduced as much as is technically and economically feasible.

Dr. Kliveter emphasized that transfer of information is a crucial factor in environmental health issues. When possible toxic exposure is discovered or being anticipated, there are questions that must be answered. How should information on exposure and its analysis be given to the public? What do they know about it? When should they hear about it? From whom? These are absolutely vital questions because regulatory agencies are there to serve the people. Many logical solutions to difficulties have been ruined because the information sharing or community involvement was done poorly or was forgotten. The community, neighborhood or city must be involved.

To be an effective problem solver, Mr. Kliveter advised to do your research on products, environmental concerns, or potential exposures of communities. Make the effort to do a thorough job of public education and citizen input when planning a course of action. Know the laws and rules for implementation, although realize that courtroom litigation is often not a good method for resolution of environmental problems. You will also need to interact with many people and organizations to reach a workable response for an environmental health issue. These include the community, interest groups, state and federal agencies, universities, corporations, state legislature and even the Governor.

When you enter the work force, Dr. Kliveter advised, remember that your employer buys your time with your salary; thus you owe your time to them. If you make it a goal to do your best, not as a function of salary or benefits but as a personal goal, you can achieve satisfaction from your job. This will help when you start to encounter the unavoidable frustrations and aggravations of holding down a job.

Dr. Kliveter concluded by saying that both policy and practice of many environmental health issues are being developed as we respond to today's concerns and crises. Thus, the environmental health sciences are a frontier in preventive medicine, public health and public health promotion. Ground-breaking work is waiting to be done in several areas: unanticipated toxic effects of things we use; standards based on scientifically sound information; regulation and administration in agencies; perception of risk vs. actual risk, especially as pertains to unanticipated toxic effects; public health education and behavior modification toward the direction of avoiding exposure and risk. There are many things to be done, many possible choices to be made in these fields, but whatever you choose, do your level best and you will get a lot more satisfaction out of it.

The third speaker in the session was to be Milan Kluko, a consultant with the firm of Gershman, Brickner & Bratton or GBB in Washington, D.C. Due to a last minute change in his schedule, Mr. Kluko was unable to attend. However, he did submit the text of what he was to present.

Following is an edited version in a form similar to the other presentation summaries.

Mr. Kluko began by saying that a career as an environmental professional can have many facets. The consulting firm for which he works is nationally recognized for engineering and management in solid waste and resource recovery. Gershman, Brickner and Bratton Inc. (GBB) provides engineering, planning, development, financial, environmental and public relations services mostly to public sector clients (e.g. city, county, and state governments). GBB specializes in all phases of solid waste management - composting, recycling, waste-to-energy and landfilling. Therefore the role(s) which he plays within the firm vary depending upon the projects to which he is assigned

Mr. Kluko said he is currently working directly on three projects for GBB. He is the Area Manager for nine waste-to-energy feasibility studies for the Michigan Department of Natural Resources. He is also the Coordinating Consultant on a regional waste-to-energy facility which is being developed in Ansonia, Conneticut. In addition, he is Project Manager on a recycling market and development study in Chicago. In each of these projects, Mr. Kluko has very different responsibilities.

Mr. Kluko went on to outline his current roles. In the Michigan project, he coordinates the collection of information which is used as the data base for the feasibility studies. He was also responsible for developing a number of sections used in the reports, including the environmental sections. In Conneticut, GBB is in charge of developing a regional 420 ton per day waste-to-energy facility for the cities of Ansonia, Derby and Shelton. On this project, he is responsible for technical documents, reviewing environmental permits and coordinating the development activities of other project team members (lawyers, bankers, financial advisors). In addition, he designed a computer model which assesses the economic feasibility of the project. With the Chicago project, Mr. Kluko coordinates project team members and develops the data base on recycling markets with the client. GBB is also developing cost data for different sized material processing centers and assessing the impact of increased levels of recycling on material markets in Chicago and the Midwest.

The consulting industry is unlike other businesses, Mr. Kluko emphasized, because you are asked to perform a variety of tasks. Often these tasks may not be your specialty or area of expertise. Therefore, it is important that you have a good understanding of your role on a particular project and within the firm. When beginning a career in the consulting field, he said it is important to have a few basic skills which will enable you to be more effective and valuable to your firm. This in turn should also help in your professional development in years to come. These skills are:

Research Skills

Often your first assignments involve a lot of data collection. The ability to locate, collect, analyze and develop raw data for a report is an important asset which you will need throughout your career.

Computer Skills

The more proficient you are on business/personal computers, the more valuable you are to your organization. Everything is done on computers. If you have limited computer skills or knowledge of computer programming, you will be at a great disadvantage when you enter the workplace.

Writing Skills

The ability to transform raw data into text is essential. The skill to develop concise discussions under a deadline will help you in all fields but it is crucial in consulting.

Management & Planning Skills

Once you are into your career, you will need to be more efficient with your time and develop good management practices. Organization and the ability to work under pressure while producing quality output will help you in any field. How you develop these skills are a manner of style.

Communication Skills

Often, after a report or analysis is completed, a presentation to the client is required. Your ability to speak clearly and communicate the findings of your work to others is important. You should feel comfortable when speaking to large audiences, confident in your presentation and responsive to questions and constructive criticism.

Mr. Kluko said that these skills have helped him tremendously in his career. He also cited EIP (Environmental Intern Program of The CEIP Fund) as providing him with very valuable experience. He stressed that all you need is a chance to show you can make a contribution. EIP gave him an opportunity. Programs like it are important to all those seeking a chance to contribute.

Questions and Answers

One of the first questions focused on residency requirements that many large cities have for their employees. Mr. Gray was asked if the City of Detroit had such a requirement and how it affected his department. He responded by saying that Detroit has a residency requirement which does have an effect in hiring practices. For example, a few years ago the department was desperate to hire people because of all the improvements that needed to be made on the waste water treatment plant. They had to recruit people from around the country. Before someone could be hired, they either had to be a city resident or had to agree to move into the city within six months of being hired. Now, a new employee has to be a resident of the city. Mr. Gray said his department was advocating that the city return to the earlier policy. Finally, he noted that other cities have residency requirements similar to Detroit's, especially the larger cities. This was a way to help assure jobs are available to city residents.

Emphasis placed on education and information by government agencies was the focus of another question. How important is education and information? What kinds of skills are necessary to become involved in this work? Dr. Kliveter replied that education and information are important and agencies have a responsibility to make people aware of government action. He cited that his agency hires people trained in science, public health and environmental science and involves these employees in information and education work. Writing and communication skills are absolutely vital to these responsibilities. Dr. Kliveter cautioned that an informed and educated public may not make your job easier. For example, they may not like what your agency is doing or be critical of how much programs cost. However, he reiterated the importance of informing and educating the public, especially on site specific projects where there is always a need for a community involvement plan.

Working for the Environment - Series I

C. Resource Management

Moderator - John R. Cook, Jr., The CEIP Fund

Mr. Ronald Hiebert, Chief, Division of Science, Indiana Dunes National Lakeshore, Porter, IN

Mr. Hiebert oversees 45 research programs and personally leads research groups in aquatic and terrestrial ecology at Indiana Dunes and for other agencies. One of his current projects in plant ecology involves the revegetation of razed residential sites.

Mr. Hiebert has also taught at the University of Northern Colorado and worked for the National Natural Landmarks Program. He has a B.S. from South Western State University of Oklahoma, and a Masters and Ph.D. in Botany from the University of Kansas.

Mr. Ermine Venuto, Manager, Woodlands Division, Mead Corporation, Escanaba, MI.

Mr. Venuto is responsible for the management of 600,000 acres of woodland in Upper Michigan. It is from this source that Mead procures the pulp wood used in manufacturing their paper. He is active in several associations, including serving as Chairman of the Central Upper Peninsula Private Industries Council and Co-chairman of the 1983 Governor's Conference on Forestry.

Mr. Venuto has a B.S. in Forestry from North Carolina State University and a M.B.A. from the State University of New York at Buffalo.

Ms. Judith Stockdale, Director of Special Projects, Open Lands Project, Chicago.

Ms. Stockdale's responsibility entails taking ideas and proposals and developing new programs. She is past Executive Director of Open Lands Project. Her other experience includes teaching geography and cartography at Southern Connecticut State College.

Ms. Stockdale earned a degree in Geography from the University of Durham (England) and a graduate degree in Forestry from Yale University. She is Vice-chair of the Illinois and Michigan Canal National Heritage Corridor Commission, on the Board of the Land Trust Exchange, and was a member of Mayor Washington's (Chicago) Task Force on Neighborhood Land Use.

Highlights

Ron Hiebert spoke about the environmental career opportunities in the National Park Service (NPS). The purposes of the NPS are 1) protection of valuable national resources and 2) education and enjoyment for the public. Experience is "half the battle" to getting a job within the NPS, but once you're there the networking is easier. Hiebert suggested that one be innovative and obtain references whenever possible. Temporary positions during the summer are good stepping stones to permanent jobs, although competition is keen for the few existing jobs. Sending a resume specifying what type of position you desire may help. He also recommended contacting people periodically, since the jobs come and go quickly, sometimes before they are even advertised. Both scientific research and social skills are important.

The second speaker, Ermine Venuto, discussed the changing role of companies such as Mead, which are trying to meet customer demand while simultaneously satisfying the environmentalists. He explained what it takes to run a mill, such as the one in Escanaba, Michigan and deal with conflict management problems a corporation faces when attempting to earn money on investments and preserve the environment. Mr. Venuto stressed the need for communication skills, as well as skills necessary to relate to other individuals. He noted that academia teaches black and white, while most solutions end up being in the gray areas.

Judith Stockdale, the third speaker on the panel, discussed the operations of a small but busy nonprofit organization in the Chicago area. She noted the freedoms and constraints involved in the nonprofit sector which differs from government and the corporations, especially since these sectors are subject to a variety of regulations. Politically, the nonprofit is free to act as a monitor or watchdog of various groups and to analyze and comment upon the actions of others. Nonprofit groups are often initiators of projects and work to bring interest groups together. Some of the constraints a nonprofit group faces are limited financial resources and having experienced people leave the nonprofit sector for the profit sector. She stressed that this area is a great place to develop one's own ideas and interests as well as to make contacts with a variety of people. The work of a nonprofit's executive staff is a bit of everything, from designing and implementing programs to fundraising and publishing newsletters. She advised doing some research on the nonprofit where you would like to work to assure the the organization is financially sound. Understanding what type of stand the group tends to take on issues is also important. Ms. Stockdale also suggested becoming involved with nonprofit groups as a financially contributing member, volunteer, or member of the board of directors.

Presentations

In his discussion about the National Park Service, Ron Hiebert noted that the competition for jobs can be very keen, but one can move up the heirarchy if one knows what to do and can make the right moves. Money is not the motivation; more important is the satisfaction that you are making a real contribution toward preserving the environment. One of the benefits of working for the NPS, Mr. Hiebert said is travelling to a variety of environments, including some places where not many people are allowed or can visit.

It is important to stay current with what is happening in government, since Congressional acts often create new jobs, or revise areas and working conditions. He noted that there are a total of approximately 7,500 permanent positions within the NPS about ten percent of which deal with environmental education or resource science.

Mr. Hiebert suggested that a good way of getting your "foot in the door" is to become one of the almost 20,000 temporary workers the NPS hires especially during the summer. Since there is not much turnover within the field, it is important to obtain experience with the NPS any way you can. He stressed the importance of obtaining references. He said "experience is half of the battle". Mr. Hiebert recommended contacting NPS locations where you are interested in finding a position.

A strong educational background in a particular area of interest was also recommended by Mr. Hiebert. However, he said you should be flexible enough to learn about other areas and to integrate these new ideas into what you already know. Permanent research positions with the NPS are very limited and most work is contracted with universities. People skills are important, as well as business skills and knowing how to incorporate data into an easily understood form. There are some positions available to interpreters, most of them are seasonal and temporary. Being able to deal with the handicapped or being bilingual (especially Spanish) can help you to secure a particular job.

Mr. Hiebert said there are volunteer positions with the NPS available each year, with some housing or living expenses provided. Contacting a NPS location will help you learn about these opportunities which can provide valuable experience. Finally, he advised participants to be assertive. Show the Parks Service that it is to their advantage to hire someone with your skills, and more importantly, to hire you.

The second speaker, Ermine Venuto, discussed some of the issues facing the Mead Corporation. These include how to face the rising consumer demand for wood products while planning for the future and creating a pleasant environment. As a business, the mill must provide a reasonable return on the investments by growing the maximum amount of quality timber possible. While doing this, managers must try to meet environmental regulations and minimize conflict. Some of the conflicts that have arisen in the past include: the issue of private versus public lands, especially in the upper peninsula of Michigan; social responsibilities of providing jobs and keeping the integrity of the area; issues regarding consumptive and nonconsumptive use of resources; visual problems when the trees are harvested; land use and site conversion.

Mr. Venuto said that Mead tries to include the perspectives of a variety of people in its decision-making process, and the issues which arise often include what the corporation desires versus what the state DNR wants. One specific problem is the presence of a large deer population, which eats the hardwood stands, thus depreciating the crop for the company. The deer belong to the state, and must be regulated by the state, and yet while the deer are eating a crop, the state is promoting forestry.

Judith Stockdale, the third panel speaker, noted that many nonprofit organizations are continually trying to raise funds, and that many of the sponsors they do have are corporations and prominent individuals. Those who work with nonprofits need to be creative and deal well with a variety of people. Often, one creates, designs and initiates his or her own program within the nonprofit organization, and must research the issue as well as plan fundraisers to help make the idea become a realistic plan. To work for nonprofits, it is important to have experience in some form of communication or business area. However, nonprofits are also great places to learn and gain experience.

Ms. Stockdale also said you need to be able to research well, to know about the resources available, to write quickly and coherently, and to meet a deadline. It is also important to have a genuine interest in the environment. There is growth in the current numbers of organizations which deal with public and nonprofit sectors. The high visibility provided by these experiences are great ways to make contacts. There is an unpredictable work load involved and it is possible to deal with an issue of national or even international scope.

Questions and Answers

In response to a question of how to get involved with the National Park Service, Mr. Hiebert noted that the National Park Service does have a VIP (Volunteer in Parks) program. The number of positions varies. In order to receive one of the positions, he advised that students be persistent, and demonstrate specific skills so that the NPS will be more inclined to use you. Mr. Hiebert said the NPS national planning office in Denver or any NPS location could provide more information on the VIP program. Mr. Hiebert went on to say that professional associations can be beneficial if you choose to get involved. These groups often have a variety of people who can become important contacts and mentors. Some associations mentioned were the American Forestry Association, the National Association of Environmental Professionals, the Natural Areas Conference, and the Ecological Society. He also recommended reviewing trade journals, many of which list employment positions.

Ms. Stockdale added to Mr. Hiebert's advice by noting that a great way to find out more about the individual associations is through directories which are available in the library. She said nonprofits also need volunteers, especially to help with funding. Ms. Stockdale also recommended checking the local newspaper or calling the local environmental reporter as a way to research potential opportunities.

A participant asked about employment as a forester with a corporation like Mead. Mr. Venuto noted that his company hires about one forester per year, and five of the seven foresters presently employed have advanced degrees. He, too, suggested contacting people periodically regarding openings, since many of the opportunities arise quickly and are filled. A general background is very helpful, and one must be able to deal with a variety of individuals. Mr. Venuto went on to say that he enjoys working for a corporation because advancement is based on merit and he felt that there are more opportunities for personal growth and development. Most corporations today attempt to adjust to the community, to provide jobs and to put money back into the local economy. Big corporations are no longer the "bad guys". The corporation assumes many identities, often putting public opinion about certain issues ahead of other corporate concerns.

Working for the Environment - Series I

D. Resource Management

Moderator - Sandra Gregerman, The University of Michigan, School of Natural Resources

Ms. Sylvia Taylor, Mio District Wildlife Supervisor, Michigan Department of Natural Resources, Mio, MI

Ms. Taylor's responsibilities include the review of all forest treatment (e.g. logging) proposals for their impact on wildlife. She also makes recommendations on the size of the hunting harvest for deer, turkey, etc. She has also served as the department's endangered species coordinator and wrote environmental impact statements on proposed highways for the Michigan Dept. of Transportation.

Ms. Taylor has a B.S. in chemistry from Eastern Michigan University and both a M.S. and Ph.D in botany from the University of Michigan. She is a Certified Wildlife Biologist and a member of The Wildlife Society, Society of American Foresters, Michigan Botanical Club and other organizations.

Ms. Elizabeth Buchanan, Ph.D., Manager of Special Projects, ACRT, Inc., Kent, OH

Ms. Buchanan's responsibility at ACRT, Inc. includes the coordination of research and consulting projects, managing street and park tree inventory projects, and working with the computer technical staff on data analysis and report writing for all vegetation projects. Past positions include Professor of Biology (also Zoology and Ecology) at Cleveland State University, Kent State University and Cuyahoga Community College (all in Ohio).

Ms. Buchanan earned her B.A. in biology at Maryville College (TN), her M.S. in biology at Appalachian State University (NC) and her Ph.D. in biology at Kent State University. She is President of the Ohio Lake Management Society, and a member of the American Institute of Biological Sciences, and International Society of Arboralculturalists.

Mr. Carl Oates, Associate Landscape Architect, Recreation Department, City of Detroit

Mr. Oates has been with the department for nine years and has design and planning experience on a wide range of projects involving riverfront parks, rehabilitation of small urban parks and street beautification. In his position, he also acts as a liason with other city departments and consultants.

Previous experience includes three years as a park planner and landscape architect with the City of Ann Arbor, MI. He has a B.S. in landscape architecture from Michigan State University and a M.S. in regional planning and landscape architecture from the University of Michigan School of Natural Resources. He is a member of the American Society of Landscape Architecture and its Michigan Chapter.

Highlights

Mr. Craig Kennedy's opening comments regarding a generalist approach within environmental careers was an underlying theme throughout this panel session. Each speaker revealed how important a generalist, or inter-disciplinary, approach was in achieving his/her present career. Dr. Sylvia Taylor, Mio District Wildlife Supervisor for the Michigan DNR, heavily stressed the importance of "professional mobility", or shifting from one speciality to another, within the resource management field. She believed that such mobility will help managers make wiser decisions based upon a greater knowledge of variables. She pointed to herself as a prime example, citing her varied past within the DNR. Mr Carl Oates, Associate Landscape Architect for the City of Detroit, cited his own interpretation of the need for a generalist approach. He observed that environmental professionals must develop professional communication and supervisory skills. He went on to say that experience and variety teach one to adapt to new career opportunities, and that one must be open to continual self-education in the work environment. Similarily, Dr. Elizabeth Buchanan, Manager of Special Projects for ARCT, Inc., advised that those interested in environmental careers must be perservering yet open to a variety of career opportunities.

In addition, panel members emphasized a strong science background. Mathamatics, chemistry, biology, and statistics are all essential in constructing a firm foundation upon which to build a resource management career. Two of the panel members held Ph.D.s, one in Botany and one in Biology, and each was convinced that a traditional science background would be extremely helpful for future environmental professionals. Dr. Buchanan said that a scientific foundation was critical as a first step in achieving a generalist approach towards resource management. Dr. Taylor was even more explicit. She believed that generalist resource management professionals must be "well educated scientists".

While all of the panel members had graduate degrees, they did touch upon the subject of entry-level positions. All three indicated that entry-level positions were stepping stones to more responsible and rewarding work. One should not have great expectations from his/her first job, nor should they expect glamorous positions. However, entry level jobs provide valuable work experience and help one adjust to the work environment.

Presentations

The first speaker, Ms. Sylvia Taylor of the Michigan Department of Natural Resources, opened her comments with a list of characteristics she felt were most important for a person working in state service. A future state service employee must be a dedicated conservationist with a strong ethical commitment to the environment. Honesty and integrity are essential. Those who are just looking to achieve financial security without commitment to resource management will not be successful. Finally, education, especially in the hard sciences, is vital. Ms. Taylor divided up education into two categories. The first category was made up of hard science/technical skills, i.e. biology, chemistry, analytic field studies, biostatistics. The second category was comprised of management/supervisory skills, i.e., communications, modern supervisory theory, integrated problem solving. She advised that as an undergraduate, 75 percent of one's education should come from the first category. The second category of skills, generalist skills, are important, but one must "be a generalist with a scientific speciality".

Dr. Taylor went on to discuss future trends in state service. First, employees are going to need to prepare for professional mobility, or movement between disciplines. Dr. Taylor used herself as an example as a trained botanist who became a certified wildlife biologist. A strong undergraduate background in science is essential for this mobility. Second, there will be an expansion of environmental careers in other departments outside of the DNR as more integration occurs. Other branches of state service will need environmental professionals as integrated problem solving increases. State agencies are looking for staff with mixed backgrounds and the new people will be instrumental in this goal. Lastly, the traditional resource management positions such as wildlife biologist, fisheries biologist, forestry management, will not grow in demand. Most of the work in this area has been refined to the point where it can be turned over to technicians.

Dr. Taylor gave some specific advice for those interested in getting employment with the Michigan DNR and other state agencies. She advised that one should replace childhood dreams or perceptions of what an environmental professional does with real career opportunities. She emphasized getting on registers, both state and federal, as soon as possible. After getting on a register, she recommended working on a Master's degree plus refining interviewing skills in anticipation of interviews. Finally, Dr. Taylor advised that one should take every part-time opportunity available to gain experience and personal contacts.

Dr. Elizabeth Buchanan spoke on the role of private consulting firms in resource management. She opened her presentation with information about her firm, ACRT (Appraisal, Consulting, Research and Training, Inc.) which provides resource inventories and tailors management strategies for urban and rural forestry, wetlands, and lakes/resevoirs systems. Her organization is comprised of 35 employees, each with a different training; i.e., forestry, horticulture, aquatic ecology, limnology, plant pathology, etc., but each working together to provide a unified product.

Dr. Buchanan emphasized the importance of a specific, hard science background for a professional in her field, but she also elaborated on the generalist theme. College training provides a foundation which must be built upon to be successful. She advised that future environmental professionals pursue their interests yet remain open to the specifics of their career. For Dr. Buchanan, private consulting was her vehicle for environmental work that met her interests and provided financial security.

Dr. Buchanan also made several suggestions for those interested in an environmental career doing private consulting. First, she recommended becoming involved with environmental organizations that have conferences, newsletters, and mailing lists. Such organizations provide up-to-date information on local, state, and national environmental issues while conferences provide opportunities to make personal contacts. Additionally, keeping abreast of environmental legislation and policy is necessary since one of the major demands for consulting firms is to establish management plans that meet specific legislative requirements. Secondly, she stressed that anyone interested in private consulting must be dedicated, insightful, and profit oriented.

General suggestions included developing a skill or hobby that is unique like scuba diving, a foreign language, or marketing. Technical field experience is extremely helpful. The ability to read, write, and edit proposals and reports is important. She recommended visiting people in consulting firms to see how their organization operates. Lastly, she advised future environmental professionals to learn the structure and responsibilities of various state agencies. Dr. Buchanan closed her remarks by saying that entry-level jobs are not glamorous, but essential as experience for future career achievements.

The last speaker was Mr. Carl Oates, an assistant landscape architect with the City of Detroit. Mr. Oates revealed that "being a professional without being professionalized" was also applicable within a municipal bureaucracy such as the City of Detroit. Although he is a landscape architect, Mr. Oates said that he works with nine different divisions, ranging from accounting to forestry to planning within his department, the Recreation Department. Much of this inter-divisional work is educational, teaching him new skills as well as giving him more responsibility. Mr. Oates mentioned a few problems specific to city environmental employees. First, politics play into department budgets and priorities. As an example, The Mayorial grounds (where the Mayor resides) are just part of the 5,000 acres managed by the Recreation Department, yet definitely first on the list of priorities. Secondly, vandalism seems a constant in any urban setting, causing continuous problems for environmental departments. Lastly, Mr. Oates elaborated on the importance of communication and supervision skills, saying that such skills are found in varying degrees with any job. However, he believed such skills are vital within a highly bureaucratic system.

Mr. Oates had several suggestions for entry level environmental professionals. He advised that students and graduates should be confident in themselves and do those things which are most rewarding. However, students cannot go into a job thinking they will be doing what they did in school. The ability to listen and understand helps an entry-level person be successful in a bureaucratic work environment. Finally, Mr. Oates recommended internships as an excellent opportunity to work for a city and make contacts for future reference.

Questions and Answers

The question of the importance of higher education in a natural resource career was asked in light of the fact that all three panel members had higher degrees. In response, Dr. Taylor emphasized that as an undergraduate interested in state service, two guidelines should be followed. Coursework should cover requirements for state technicians and seniors should take Civil Service tests. She went on to add that a Master's is very helpful in specializing and was recommended. Mr. Oates replied that one should get as much education as one can for personal development. As for career needs, he referred to city requirements that state exactly what level of education is needed for specific positions. From the private consulting perspective, Dr. Buchanan believed that the training from advanced degrees was essential for the research service her company offered. She added, however, that experience was valuable enough in some cases to be a substitute to higher education.

Panel members were asked to forecast what the job market in each corresponding profession would be like in the near future. Dr. Taylor replied that within Michigan, the Governor was dedicated to a reduction of state service employees, meaning state service jobs were not going to be readily available. From a broader perspective she felt that 90 percent of future jobs had yet to be invented. Only 10 percent of the jobs available in the future will be replacement positions in the environmental field. Mr. Oates replied that specifically within the Recreation Department, forestry openings would be turning over in the next few years. He added that, in general, municipal budgets fluctuate so much that it is difficult to forecast what funding will be available to hire additional people. Dr. Buchanan said that her company usually incorporates entry-level people as summer interns. However, they do not experience much turnover within their own company. She later added that she believed the market for private environmental consulting firms was expanding as more firms specialized in particular environmental areas, for example, land use planning, hazardous waste management, environmental health.

Dr. Buchanan when asked about where to find information on consulting firms, suggested trade organizations, professional journals and newsletters as well as career resource centers at universities.

Mini-Sessions

These were five concurrent sessions from 12:00 to 12:30 p.m. and repeated from 12:45 to 1:15 p.m. They were presented to give participants an opportunity to learn more about environmentally related programs we thought would be of interest. We featured four programs.

* Environmental Work Opportunities Through EIP (formerly Environmental Intern Program).
  Presented by John R. Cook, Jr., President, The CEIP Fund, which operates the EIPs.

* Undergraduate and Graduate Programs at The University of Michigan School of Natural Resources.
  Presented by Connie Ruth, Placement Coordinator, and Sandra Gregerman, Student Services Associate, The University of Michigan School of Natural Resources, Office of Academic Programs.

* Environmental Work Opportunities Overseas with the Peace Corps.
  Presented by Kathleen Gamble, Area Representative, U.S. Peace Corps.

* National and Michigan Associations of Environmental Professionals.
  Presented by Marcella Colling, President, Michigan Association of Environmental Professionals (MAEP) and Harriet Greenwood, Past President and Board member, MAEP.

The fifth session was different than these four in that it focused on a particular topic "Resources for the Environmental Job Search," presented by Lee DeAngelis, Director, Professional Development Services, The CEIP Fund.

Following is the information presented at these mini-sessions.

Environmental Work Opportunities Through EIP (formerly Environmental Intern Program)

Introduction: "EIP" or The Environmental Intern Program is a program of The CEIP Fund (formerly The Center for Environmental Intern Programs), a private, nonprofit organization based in Boston. CEIP has two primary interests:

(1) Providing college students, recent graduates and others with an opportunity to "learn by doing" through practical experience with organizations working on actual problems, and

(2) Helping government agencies, corporations and nonprofit organizations to complete projects through the use of skilled short-term assistance.

The CEIP Fund operates four EIPs, originally known as the "Environmental Intern Programs". In 1972, the first EIP was started in Boston to serve the six New England states. The program was a response to the staffing needs of new environmental agencies, departments and organizations and the increasing interest of college students in environmental management careers. Other EIPs were developed in San Francisco (1977), Cleveland (1978), and Seattle (1980). The four offices serve seventeen states. The addresses, telephone numbers and states served by each office are included below.

The CEIP Fund's work now encompasses a broad range of projects in the fields of environmental protection, resource management, public policy and community development. Since 1972, over 2,800 projects have been managed through the EIPs with over 600 organizations nationwide.

What CEIP Offers

The staff at the regional offices enter into contracts with government agencies, corporations and nonprofit organizations for short-term projects, usually 12 or 24 weeks in length, but can be up to 52 weeks. College students (By the time a project starts, a student must have completed the junior year of college. However, application can be made prior to completion.) and recent graduates are recruited by CEIP. Their applications are reviewed by EIP staff with the top candidates being referred to the sponsoring organization for further review. The sponsor interviews the best candidates and selects the person they desire to become their "CEIP Associate".

The CEIP Fund hires the CEIP Associate for the length of the project, handles all payroll and related matters and monitors the project with an on-site visit and other communications. The EIP Associate is paid a salary set by the sponsor which ranges from $200 to as high as $600 per week. Salaries depend on the type of sponsor, project, educational level of the Associate and skills required. All Associates work on-site with the sponsor and are supervised by the organization's staff.

Through their projects, CEIP Associates gain valuable professional level experience. The regional EIP office develops conferences, workshops, seminars or informal activities where Associates can meet one another, interact with professionals and learn more about professional development in their field. Through the on-site visit, EIP regional staff begins career counseling and can arrange for additional assistance depending upon the Associate's needs.

What happens after the project with EIP? Often projects are extended and Associates choose to continue. Frequently, Associates are offered and accept permanent positions with the sponsor. Other Associates return to school, go on to another short-term project or a permanent position with organizations other than their sponsors. Whatever the Associates do or wherever they go, they become CEIP alumni and are welcome to consult with EIP staff at any time about career opportunities. The CEIP Fund communicates regularly with all alumni to keep them informed of activities and to seek their input on how CEIP can serve them.

Work Accomplished by CEIP Associates

In 1985, as many as 301 CEIP Associates were working with corporations, government agencies and nonprofits on a wide range of projects. The majority of the work was funded by the sponsoring organizations. A significant number of projects were jointly funded by the sponsor and The CEIP Fund through money it raised mainly from private foundations and corporate donors. Government agencies and nonprofits seeking joint funding for a CEIP Associate apply to CEIP's "Project Assistance Fund". College students can also develop their own project with an agency or organization and seek matching funds by applying to CEIP's "Student Initiated Project" program.

Following is a sampling of 1985 projects, Associates and sponsors from the four EIP regions.

EIP/Northeast

* For Arthur D. Little, Inc., Christopher Loreti (Washington Univ., MS/Engineering & Policy, 1984) assisted the environmental management section on chemical database consulting projects and produced a handbook on inorganic chemicals for environmental managers.

* Sarah H. Conyngham (Brown Univ., BA/Environmental Sciences, 1985) analyzed waste load allocation and did mathematical modeling of the Pawtucket River for the Rhode Island Department of Environmental Management.

* Brian Rohan (St. John's Univ., BA/Environmental Studies, 1986) Working with the Environmental Action Coalition in New York City, he conducted a training workshop for community leaders to help them understand actions to minimize pollution sources going into wells.

* Ann-Renee Larouche (Conway School, MA/Landscape Design, 1985) created a detailed set of recreation land use plans for the Town of Manchester, MA. She evaluated sites and created design proposals and cost estimates for facility development. The project was supported through the Project Assistance Fund.

EIP/Great Lakes

* Toxic spill prevention, control and clean-up were the focus of Chuck Campbell's (Univ. of Michigan/Ann Arbor, MS/Oceanic Science, 1984) project with the Standard Oil Company. Chuck worked on developing an aquatic toxicity database for selected SOHIO products which would be used in the event of a release of toxic substances into the environment.

* Sharon Edgar (Univ. of Michigan/Ann Arbor, MS/Natural Resources, 1985) assisted the Center for the Great Lakes in Chicago with the investigation and documentation of federal and state efforts to address Great Lakes water quality problems. The project was supported through The Project Assistance Fund.

* The Environmental Activities staff of Chrysler Corporation needed assistance over a number of months with a variety of air pollution emissions control projects. They were able to handle the increased workload through two EIP Associates -- Corbin Leininger (Indiana Univ./Bloomington, BS/Environmental Affairs, 1984), and Timothy Gusfa (Univ. of Michigan/Dearborn, BS/Environmental Science, 1982). The positions of both Associates were extended into 1986.

* Through the Student Initiated Projects program, Sharon Gregory (Purdue Univ./West Lafayette, BS/Mechanical Engineering, 1985) conducted an energy use study of older city-owned buildings for the City of Gary, Indiana. Working with the City Engineer, she also developed recommendations for conserving energy. After graduation, Sharon continued to assist the City Engineer with other projects.

* Household and common hazardous materials were the focus of Janet Senior's (Univ. of Michigan/Ann Arbor, MS/Natural Resource Policy and Management, 1986) project with the Ecology Center in Ann Arbor, Michigan. Janet developed an information directory on hazardous materials and disposal options that could be adapted for use in the entire state of Michigan. The project was supported through the Project Assistance Fund.

EIP/Pacific Northwest

* Sally Toteff (Western Washington Univ., BS/Environmental Education, 1986) managed Seattle's nationally recognized Household Hazardous Waste Disposal Program. Sally's position at the Municipality of Metropolitan Seattle (Metro) put her in charge of writing public education books, speaking to citizen groups, staffing Metro's household waste hot line and providing technical help to regional committees and task forces.

* For the Washington Department of Transportation, Kirstin Martinson (Washington State Univ. BA/Landscape Architecture, 1984) studied highway sound barriers throughout Washington. Implementation of Kirstin's recommendations would significantly reduce the state's sound pollution. In addition, Kirstin researched and wrote the

DOT's state-wide manual on how to prepare environmental impact statements.

* For the U.S. EPA Laboratories in Manchester, WA, Velma Richardson (Bennedict College, BS/Biology, 1985) performed chemistry analyses. Velma was one of several Associates participating in the CEIP/U.S. EPA Minority Fellows Program. Her work involved automatic spectrophotometry, ion chromatography, metals analysis and other chemical tests.

* Susan Wade (Univ. of Washington, MA/Marine Studies, 1984) prepared an analysis of storage techniques for high-level nuclear waste at Hanford, WA for the Washington State Department of Ecology. Susan's study was funded through the Student Initiated Projects program.

EIP/California

* For Lawrence Livermore National Laboratory, Margaret Torn (Univ. of California/Berkeley, BS/Conservation & Resource Studies, 1984) conducted a preliminary evaluation of potential acid rain deposition effects in Alberta, Canada by compiling information and ranking and mapping air pollution sources.

* Joshua Shiffman (Sonoma State Univ., BA/Environmental Studies & Planning, 1985), helped the San Francisco Public Utilities Commission implement a multi-family home energy conservation financing program. He worked with building owners/builders to promote energy conservation.

* Tamara McCandless (Indiana Univ., BS/Biology, 1985) assisted the California Tahoe Conservancy staff on a variety of tasks including acquisition programs, field inspections, site analyses and evaluation of grant programs.

* Scott Rice (Univ. of Minnesota, BA/Geology, 1984) examined methods of on-site storage of hazardous materials for the toxic compliance program at General Telephone (GTE) in Pomona, CA.

* The Air Pollution Control District of Santa Barbara used the legal skills of Virginia Uybungco (Univ. of San Diego, JD, 1981) to rewrite the district's air quality rules and regulations to comply with federal, state, and local requirements.

* The Energy Division of Santa Barbara used the services of Susan Strachan (Univ. of California/Santa Barbara, BA/Political Science, 1985) for work within the Resource Management Department on offshore oil-drilling permits. Susan was involved with the Union Oil Point Pedernalis project, a pipeline and oil dehydration facility, pump station and electrical substation. She coordinated and conducted meetings with county officials and Union Oil representatives, presented the projects before the Board of Architectural Review

and linked other county agencies with Union Oil. Susan was hired as a permanent employee following completion of the project.

- Esther Feldman (Univ. of California/Davis, BS/Soil and Water Science, 1984) researched the feasibility of a statewide bond act to protect or acquire open space for urban greenbelts for the Planning and Conservation Foundation in Sacramento, CA. The project was supported through the Project Assistance Fund.

For more information:

The staff of The CEIP Fund and its regional offices welcomes inquiries from potential applicants or sponsors as well as anyone interested in environmental careers. Following are the offices to contact.

* The CEIP Fund
68 Harrison Ave.
Boston, MA 02111
(617) 426-4375

Can provide general information on all activities.

* The CEIP Fund
Professional Development Services
332 The Arcade
Cleveland, OH 44114
(216) 861-4424

Can provide information on planning for environmental careers.

* EIP/Northeast
68 Harrison Ave.
Boston, MA 02111
(617) 426-4783

Can provide information on project opportunities and application procedures for EIP work in Massachusetts, Maine, New Hampshire, Vermont, Rhode Island, Connecticut, New York, and New Jersey.

* EIP/Great Lakes
332 The Arcade
Cleveland, OH 44114
(216) 861-4545

Can provide information on project opportunities and application procedures for EIP work in Ohio, Michigan, Illinois, Indiana, and western Pennsylvania.

* EIP/Pacific Northwest
731 Securities Building
Seattle, WA 98101
(206) 625-1750

Can provide information on project opportunities and application procedures for EIP work in Washington, Oregon and Alaska.

* EIP/California
512 Second Street
San Francisco, CA 94107
(415) 543-4400

Can provide information on project opportunities and application procedures for EIP work in California.

THE SCHOOL OF NATURAL RESOURCES AT THE UNIVERSITY OF MICHIGAN:

An Overview of Undergraduate and Graduate Programs

The School of Natural Resources at The University of Michigan is a leader in natural resources education, training professionals to solve complex natural and environmental resource problems at the local, state, national, and international levels.

As one of the seventeen schools and colleges at The University of Michigan, the School of Natural Resources provides its students with access to superior library, teaching, and computer facilities (including a micrcomputer lab within the School itself); a distinguished faculty; an extensive array of course offerings; and the many other opportunities that only a nationally renowned university can offer. Yet with a total enrollment of about 400 students, the School of Natural Resources provides the personal attention, sense of community, and friendly atmosphere of a small school.

The School of Natural Resources grants degrees at the bachelor, master's, and doctoral levels. Students receive a Bachelor of Science degree in Natural Resources (B.S.N.R.) upon successful completion of the undergraduate curriculum. Graduate degrees offered by the School include the Master of Science (M.S.), Master of Forestry (M.F.), and Master of Landscape Architecture (M.L.A.). A Doctor of Philosophy Degree (Ph.D.) can be earned through the School in either Natural Resources, Natural Resource Economics, or Landscape Architecture.

Undergraduate Program

At the undergraduate level, which is open to incoming freshmen as well as transfers, students broaden their understanding of natural and social systems by taking required core courses which include applied ecology, resource management, environmental policy, the socio-behavioral sciences, economics, and statistics. Students also elect one of two concentration areas. The Biophysical Concentration is designed for students interested in field-oriented studies of natural resources such as the biology, ecology and management of forests, wildlife, fish, water, and soils. The Socio-behavioral Concentration is designed for students who wish to focus on the effect of humans and organizations on natural resources through the study of political science, sociology, psychology, economics, anthropology, and environmental education. Competence in either of the concentrations provides a strong background for graduate study in diverse professional fields.

Master's and Doctoral Programs

The School of Natural Resources has recently redesigned its Master's Program to prepare professionals in research, management, and teaching who can take responsibility for the natural resource and environmental challenges of the next fifty years. The result of this effort has been to combine specialization in a particular discipline with an integrative, analytical understanding of the varied aspects of natural resource and environmental issues. Interdisciplinary analysis, involving both the biophysical and socio-behavioral sciences, is the key foundation of this aspect of the new Master's Program. Courses on integrative problem-solving methods supplement fieldwork and research experience in the student's chosen area of specialization.

The Master's Program has three concentrations within which students pursue their chosen area of specialization. The **Management, Planning, and Policy** concentration is designed for students interested in careers in management (forestry, fisheries, wildlife, aquatics, wildland); planning (landscape architecture and design); or policy (resource economics, resource policy and administration, and environmental advocacy, education, and communication). This concentration focuses on training students to effectively develop, manage, and protect natural and environmental systems.

Students in the Management, Planning, and Policy concentration specialize in one of the 10 fields listed below:

Forest Resource Management
Wildlife Management
Wildland Management
Fisheries Management
Aquatic Resource Management
Quantitative Resource Management
Landscape Architecture
Resource Policy Analysis
Resource Administration
Environmental Advocacy, Communication, Education

The **Resource Ecology** concentration focuses on the development and use of scientific research methods and skills to generate new knowledge about species and ecosystems and to provide decision makers with information to help solve natural resource problems and maintain a quality environment. Students specialize in specific areas such as forest ecology, wetlands ecology, and wildlife ecology.

The **Resource Institutions and Human Behavior** concentration focuses on the social scientific study of how individual, group, and institutional behavior affect the use and allocation of natural resources and how they are affected by the natural environment.

As basic knowledge and analytical skills are acquired, students focus on their selected field by taking courses both within the School of Natural Resources and in other departments, schools, and colleges at The University of Michigan. The School also offers dual and joint degree programs with other schools at the University including Law (J.D.), Business (M.B.A.), and Public Policy (M.P.P.).

The integrative approach and specialized knowledge are brought together on either a master's project focusing on interdisciplinary problem-solving or a thesis emphasizing original research. In this way, students are able to pursue the track which will be most useful to them in the professional world.

The new integrative design of the Master's Program within the School of Natural Resources is an innovative approach unique to this school, and is therefore turning out graduates with experience in the various fields of natural resources difficult to find elsewhere. These graduates are filling a valuable niche in the environmental and natural resource fields.

The Ph.D. program offered in the School of Natural Resources trains outstanding scholars to define, understand, evaluate and resolve environmental problems through research designed to generate new knowledge and applications of their research.

Career Resource Center

Among the School of Natural Resources' many resources and facilities is the Career Resource Center which provides valuable career planning services to assist students in obtaining internships and permanent positions.

- A full time placement coordinator provides career planning advice through workshop presentations and individual counseling.
- The School of Natural Resources Job Bulletin is published weekly during the fall and winter terms.
- The Career Resource Library makes available for students job search references and directories along with extensive files containing information about natural resource related agencies and organizations within the government, non-profit, and private sectors.
- An interactive computerized job bank listing natural resource related positions is available for student use.

In addition to summer internships, both undergraduate and graduate students can take advantage of the School's field station, Camp Filibert Roth, which offers field courses in the natural surroundings of Michigan's Upper Peninsula.

The School of Natural Resources at The University of Michigan is at the forefront of education in the ever-changing environmental and natural resource fields. It provides students at both the graduate and undergraduate levels with a comprehensive and integrative education, preparing them to meet the challenges facing resource professionals now and in the future.

For further information please write or call: Mary Stamm, Office of Academic Programs, School of Natural Resources, The University of Michigan, Ann Arbor, MI 48109-1115; (313)764-1404.

Resources for the Environmental Job Search

Lee P. DeAngelis, Director, Professional Development Services, The CEIP Fund

Mr. DeAngelis began by stating the topic, "Resources For The Environmental Job Search," was one segment from a three-hour environmental career planning workshop The CEIP Fund was sponsoring during the fall. 1986 in five locations in the Great Lakes. He briefly reviewed the handout "Environmental Career Planning Resources," which is included as Appendix 1 in this publication.

No matter what your job search interests in the environmental field Mr. DeAngelis noted, there are three main resources you should use in order to learn about opportunities. These resources are: Literature, People, and Events.

Mr. DeAngelis said there is a wide array of literature available that can help with a job search. He highlighted the following:

Newspapers: You should read a newspaper every day, especially a major metropolitan daily or the best paper covering a particular geographic area that interests you. The paper will cover those environmental issues and activity on many different levels. Organizations, agencies, corporations and professionals will be identified in articles

Free publications: Many government agencies, nonprofits and some corporations have a variety of free literature on environmental issues, activity, programs, laws, etc. that can be a good source of information and contacts. Very often you can receive these publications by just asking to be on a mailing list.

Magazines/Journals/Newsletters. There are many environmental publications, some very general and some very specialized. A number of these are listed in the handout (Appendix 1). Mr. DeAngelis encouraged participants to seek out those periodicals that are in line with their career interests and review them regularly for career-related information like positions available, programs, contacts, and events where you can meet professionals and learn about opportunities. Most of the publications can be found in college or public libraries or are received by college faculty and staff.

Annual Reports: Just about all government agencies and nonprofits publish some kind of annual report. Public corporations have annual reports and "10-K" reports (required by the Securities and Exchange Commission).

These can be excellent "snapshots" of a company, agency, or organization -- who they are; what they do; budgets; issues they are facing; past, current and future projects; and staff. Mr. DeAngelis said that a corporation's annual report and 10-K report may not always say something about their environmental work, however these publications will identify facilities, plants and all other company properties as well as the top one or two corporate officials in health, safety and environmental affairs.

Directories: There are environmental directories available like the Conservation Directory (see Appendix) as well as those often compiled by nonprofits. These are listings of a range of government agencies and nonprofit organizations included in environmental fields. Mr. DeAngelis also noted there is a Consultants and Consulting Organizations Directory (by Gale Research Co.) available in a good public library which can help identify environmental consulting firms. He also said most government agencies have staff directories. Although these are not usually for distribution, a contact you make at an agency might let you review a directory on the premises.

The second important category of job search resources were people. Mr. DeAngelis said you should not hide the fact that you are researching potential opportunities. He encouraged participants to talk with as many people as possible even those who may not know anything about environmental affairs. These people may know people who could be helpful. Building a "network" of contacts is essential. Mr. DeAngelis discussed the following categories of people resources.

College Faculty, Staff and Students.

He said you should talk with your teachers, advisors, career counselors and fellow students. Mr. DeAngelis strongly encouraged students to talk to one another about their career plans and job searches. He said "two heads are better than one". Students should not hide information from one another because of a perception that they are competing with one another. If you help someone, they will be more likely to return the favor.

Mr. DeAngelis also recommended that students at smaller colleges or programs should consider seeking advice from staff at universities with larger environmentally related schools or programs. These programs often have at least one person who has part of their responsibility to focus on environmental career counseling. These people will talk to students from other colleges, especially if you express interest in graduate study at their school.

Alumni: Mr. DeAngelis said a key resource for students was alumni of their college programs. He said most environmental programs are relatively small, thus it should be easy to identify alumni. Students should seek out alumni since they are working in the field where you want to be. Mr. Mr. DeAngelis stressed that students have a strong common bond with their college program's alumni -- same school, program, teachers, courses and experiences. He suggested students advocate that their programs establish a system to track and stay in contact with alumni.

Friends, Relatives, Neighbors: Do not overlook the obvious, Mr. DeAngelis said. Your friends, relatives and neighbors are people you should contact about your career interests. Even though they may not know a thing about your field of interest, they may know people who can help. Mr. DeAngelis said you should especially seek out these people if you have interests in a specific geographic location, corporation, agency or organization. By stating your interests and asking "Who or what do you know about it?" your friend, relative or neighbor could put you on the right path.

Professional Societies: Mr. DeAngelis referred to the handout in Appendix 1 and stressed that students get involved with professional societies like those listed. Many have state and local chapters and student membership rates. Some have college chapters. They welcome and encourage student participation. He said you need to establish contact with professionals in the fields that interest you. These societies and associations are an ideal way to meet people at monthly or quarterly activities or at conferences.

Mr. DeAngelis' comments on the value of professional societies led to the presentation of the third major resource -- events. He stressed that participants should seek out those meetings, conferences, workshops, seminars, etc. where people with their interests will be present. Mr. DeAngelis said there are numerous types of environmental events happening all the time. They are sponsored by professional associations, industry trade associations, government agencies, nonprofits and colleges. Very often these events have student rates.

Mr. DeAngelis cited an example of a conference he attended in 1985 sponsored by an environmental professional organization. He said there were probably 150 people who were the professionals students would do anything to meet. Yet, only about ten students were in attendance. Those students were creative career planners.

He concluded his discussion of the importance of events by reiterating the value of student attendance. Mr. DeAngelis said professionals are impressed when they see students at professional level conferences. Your presence tells them you are very serious about your career interests.

Finally, Mr. DeAngelis encouraged participants to budget the time and money to read the literature, meet the people and attend the events. He said you should view the time and money spent as an investment in your career. The earlier you make this investment and the more attention you give it, the better. Each step will bring you closer to your goals.

Environmental Work Opportunities Overseas with the Peace Corps

Ms. Kathleen Gamble, Area Representative, U.S. Peace Corps.

Ms. Gamble's responsibilities are two-fold. In addition to increasing public awareness of the Peace Corps, she travels all over Ohio and Michigan recruiting individuals to join the Peace Corps. She has spent two years as a Peace Corps volunteer in Kenya.

Ms. Gamble has a B.S. in natural resources from the University of Michigan and a teaching degree in environmental education. She is currently working on a Masters degree in science education at Wayne State University.

Summary

Introduction

Peace Corps, celebrating its "25th Anniversary Year," is the international volunteer service agency established to help people in developing nations become self-sufficient. It was designed to promote better understanding of Americans abroad and greater knowledge of developing countries here at home.

At the mid-point of its third decade, the Peace Corps has 5,935 Volunteers who are working to improve living conditions in 62 countries of Africa, Asia, Latin America and the Pacific.

The Volunteer

The average age of Volunteers in FY (Fiscal Year) 1985 was 29.1 up from 28.5 years in FY 1984 and from 24 or 25 in Peace Corps' early years.

Nearly half of the Volunteers are women. Seven percent or 438 are Senior Volunteers. Six percent are members of minority groups. Forty-seven percent of Volunteers have scarce skills; 53 percent have a background as a generalist.

In FY 1985 the largest numbers of Volunteers worked in the education sector (38%) and in agriculture programs (26%). But Volunteer assignments covered a range of areas critical to the developing world, including water and sanitation, health and nutrition and small enterprise development.

The Program

The largest number of Volunteers serve in sub-Saharan Africa, where hunger continues to be a problem of dramatic magnitude. In FY 1985 Peace Corps launched a new, long-term initiative to send specially selected and trained teams of Volunteers to work on efforts to alleviate the region's long-range shortage of food.

On assignment in the host countries they work with small-scale farmers (most of whom are women) and other international agencies on land preparation and water supply, food production and post-production activities such as preservation, processing, marketing and nutrition education.

The second largest group of Peace Corps Volunteers serves in the Inter-American Region on ten Caribbean islands and in nine other countries. They are utilizing more specialized skills than ever before in Peace

Corps history. Twenty-nine percent work on primary assignments in education; 25 percent in food production; 13 percent in health and nutrition; seven percent in energy and forestry; and six percent in small enterprise development.

The North Africa, Near East, Asia and the Pacific (NANEAP) Region is host to more than 1,450 Volunteers; and to the largest country program, which comprises a force of more than 330 Volunteers in the Philippines. Reflecting the diversity of the nations in the region, the Volunteers' assignments range from development of marine and inland fish resources in Tunisia to teaching English in Sri Lanka.

How You Can Help

Peace Corps needs dozens of different skills. But, in general, volunteers with almost any background can be chosen. Especially needed these days are volunteers with experience or degrees in the life sciences -- biology, botany, physics, chemistry -- and with environment-related skills and training. They will work in reforestation, fisheries, agriculture, disease control and education projects. Following are samples of environmental work opportunities with the Peace Corps.

Foresters. Volunteers with degrees in forestry, or who are trained by Peace Corps for such work, are in great demand in developing countries. The challenges: helping the host country co-workers find creative solutions to encroaching deserts, overgrazing, fuel wood shortages and eroding watersheds.

Fishery Specialists. Peace Corps freshwater, marine and commercial fish specialists help farmers stock, manage, feed and harvest pond fish. They help develop warm water fish culture, marketing and conservation and they teach local fishermen how to improve their techniques.

Agriculturalists. Volunteers with agriculture degrees or farm or vegetable gardening background assist in areas ranging from agronomy and farm economics to crop production and plant protection; to farm mechanics and irrigation; to soil conservation, apiculture and animal husbandry.

Science Professionals. If you have any kind of science skills, a host country probably wants you to participate in a wide variety of projects. They need help in solving technical problems, teaching or in improving the environment, and in countless other ways.

Engineers. Jobs for Peace Corps engineers are as varied as the countries who request them. Dam and spillway projects, waterflow data and soil tests, rural electrification and potable water supply systems are just a few examples.

Training

Before going overseas, each Peace Corps Volunteer attends orientation workshops varying in length according to the demands of host countries. Some Volunteers also receive special technical training at United States colleges or universities before traveling abroad.

Upon arrival in their assigned countries, Volunteers receive from 8 to 12 weeks of intensive language, cultural and technical training. Periodic in-service workshops are conducted for Volunteers in most countries to reinforce their skills, assist them with problems and project planning and teach them new skills to enhance their ability to serve their communities in multiple ways.

Peace Corps Volunteers live at the level of their host country counterparts. This includes both rural and urban settings. Each Volunteer is affiliated with a host country agency and maintains contact with host agency officials as well as Peace Corps staff. Often Peace Corps Volunteers either share work-sites with other Volunteers or are located near other Volunteers. Although you will leave family and friends for a time, many Volunteers feel that one of the most rewarding aspects of the Peace Corps experience is in making new friends and being welcomed into host country families.

Shortly before the end of their first two years, Volunteers attend close-of-service workshops where they are briefed on the social, political and economic climate at home and receive individual counseling on career goals and job opportunities. Peace Corps' Office of Returned Volunteer Service also provides career, educational and readjustment guidance and job listing bulletins to Volunteers re-entering the public or private sectors.

Benefits

During Peace Corps service, Volunteers receive a monthly allowance for housing, food, clothing and incidentals. They also receive free medical and dental care, transportation to and from their overseas site and 24 vacation days a year. Student loan payments are deferred for the duration of Peace Corps service.

Following Peace Corps service, Volunteers receive a readjustment allowance of $175 for each month of training and service, totaling $4,200 after a two-year assignment. They are eligible for federal employment on a non-competitive basis for one year and possible graduate school credit for Peace Corps experience. Perhaps your university or college offers special scholarships to returned Volunteers.

For more information

Please write: Peace Corps
806 Connecticut Ave., N.W.
Room P-301
Washington, DC 20526

or call toll free: 1 (800) 424-8580 ext. 93

There is a variety of brochures and publications available including "The Peace Corps: Challenge in the 80's."

You can also contact a Local Peace Corps Recruiter. A college's career planning office should have information on the Peace Corps recruiter for your area.

National and Michigan Associations of Environmental Professionals

Ms. Marcella Colling, President, Michigan Association of Environmental Professionals (MAEP) and Harriet Greenwood, Past President and Board member, MAEP.

Ms. Colling and Ms. Greenwood discussed the activities, programs and benefits of membership in the National and/or Michigan Associations of Environmental Professionals. Both associations welcome students interested in environmental careers.

Ms. Colling is an environmental engineer for Quanex Corporation's MacSteel Division, Jackson, MI. She is responsible for this steel bar manufacturer's compliance with all pollution control laws and regulations. Ms. Colling is a graduate of the University of Michigan with a B.S. in environmental sciences.

Ms. Greenwood is an environmental policy specialist with Clayton Environmental Consultants, Southfield, MI. She is involved with environmental auditing, risk assessment and environmental conflict management. Ms. Greenwood has a B.A. in biology and M.S. in environmental education from Antioch University (OH). She is a Ph.D. candidate at the University of Michigan in environmental conflict management.

Summary

The National Association of Environmental Professionals(NAEP), founded in 1975, is an interdisciplinary society of environmental professionals in the U.S. and abroad. It is a forum in which the state-of-the-art in environmental planning, research and management is advanced. NAEP is a focal point for objectivity, ethical standards and technical excellence as well as a medium of professional contact and information exchange among colleagues in business, government, colleges and nonprofit organizations. Finally, NAEP is a foundation for structured career development from student membership to certified environmental professional.

NAEP's professional development opportunities include:

* Annual conference.
* Monthly newsletter
* Quarterly Journal, The Environmental Professional.
* Professional and technical committees
* Regional and state chapter activities
* Professional certification. This is a voluntary certiification program for environmental professionals specially qualified by a combination of education, experience and proven accomplishment.

There are five categories of membership in NAEP. Annual fees vary with type of membership, but include the monthly newsletter and quarterly journal. All members also subscribe to the "Code of Ethics and Standards of Practice for Environmental Professionals." (This code is presented at the end of the summary and was taken from a Michigan Association of Environmental Professionals brochure.) Membership categories are:

General Membership

General membership normally requires appropriate educational background and three (3) years experience and is open to all persons who have been engaged in work directly related to environmental management, planning, impact assessment, environmental protection or environmental compliance including such activities as permitting, compliance auditing, regulatory review, research, teaching, engineering, design, quality assurance and implementation of environmental protection and control. Only general members are eligible to vote and hold office.

Associate Membership

Associate membership is open to those who do not meet the general membership requirements and to other individuals who are interested in environmental issues, ideas or technology.

Student Membership

Membership is offered to full-time students who are pursuing an environmentally related career.

Corporate/Institutional Membership

Corporations, universities, colleges, partnerships, government agencies, business and trade groups and other entities supportive of the environmental professions are eligible for this classification.

Spousal Membership

The spouse of any general member in good standing is eligible for this classification.

For more information on NAEP, its activities, regional and state chapters and membership fees, write:

National Association of Environmental Professionals
P.O. Box 9400
Washington, D.C. 20016

The Michigan Association of Environmental Professionals (MAEP) is affiliated with the National Association of Environmental Professionals. Thus, MAEP has similar objectives and membership categories including one for students. All members subscribe to the Code presented at the end of this section. They have education and experience in a variety of fields such as: biology, geology, meteorology, forestry, ecology, hydrology, physics, law, urban planning, architecture, engineering, chemistry, economics, human ecology, archaeology, sociology or public administration.

MAEP is committed to:

- Focusing on environmental issues and policies in Michigan.
- Cosponsoring conferences with other professional associations on environmental issues in the Great Lakes region. MAEP holds an annual conference. In 1986, it was titled "Issues and Opportunities for the Environmental Professional". Topics included hazardous waste management certification programs, environmental contaminant remediation and environmental conflict resolution.
- Providing input to the National Association of Environmental Professionals on national environmental issues and policies.

- * Providing member services consistent with the needs of a growing new professional association. This includes a staffed office, monthly newsletter and a job listing service.
- * Providing new members with "challenging" leadership opportunities.

For more information on MAEP, its activities and membership fees, write:

Michigan Association of Environmental Professionals
15694 N. East Street
Lansing, MI 48906

CODE OF ETHICS AND STANDARDS OF PRACTICE FOR ENVIRONMENTAL PROFESSIONALS

The objectives of Environmental Professionals are to conduct their personal and professional lives and activities in an ethical manner. Honesty, justice and courtesy form a moral philosophy which, associated with a mutual interest among people, constitute the foundation of ethics. Environmental Professionals should recognize such a standard, not in passive observance, but as a set of dynamic principles guiding their conduct and way of life. It is their duty to practice their profession according to this Code of Ethics.

As the keystone of professional conduct is integrity, Environmental Professionals will discharge their duties with fidelity to the public, their employers, and clients, and with fairness and impartiality to all. It is their duty to interest themselves in public welfare, and to be ready to apply their special knowledge for the benefit of mankind and their environment.

CREED:
The objectives of an Environmental Professional are:
1. to recognize and attempt to reconcile societal and individual human needs with responsibility for physical, natural and cultural systems.
2. to promote and develop policies, plans, activities and projects that achieve complementary and mutual support between natural and man-made, and present and future components of the physical, natural and cultural environment.

ETHICS:
As an Environmental Professional I will:
1. be personally responsible for the validity of all data collected, analyses performed, or plans developed by me or under my direction. I will be responsible and ethical in my professional activities.
2. encourage research, planning, design, management and review of activities in a scientifically and technically objective manner. I will incorporate the best principles of the environmental sciences for the mitigation of environmental harm and enhancement of environmental quality.
3. not condone misrepresentation of work I have performed or that was performed under my direction.
4. examine all of my relationships or actions which could be legitimately interpreted as a conflict of interest by clients, officials, the public, or peers. In any instance where I have a financial or personal interest in the activities with which they are directly or indirectly involved, I will make a full disclosure of that interest to my employer, client, or other affected parties.
5. not engage in conduct involving dishonesty, fraud, deceit or misrepresentation or discrimination.
6. not accept fees wholly or partially contingent on the clients desired result where that desired result conflicts with my professional judgment.

CONTINUED

GUIDANCE FOR PRACTICE AS AN ENVIRONMENTAL PROFESSIONAL:
As an Environmental Professional I will:
1. encourage environmental planning to begin in the earliest stages of project conceptualization.
2. recognize that total environmental management involves the consideration of all environmental factors including: technical, economic, ecological, and sociopolitical and their inter-relationships.
3. incorporate the best principles of design and environmental planning when recommending measures to reduce environmental harm and enhance environmental quality.
4. conduct my analysis, planning, design and review activities primarily in subject areas for which I am qualified, and shall encourage and recognize the participation of other professionals in subject areas where I am less experienced. I shall utilize and participate in interdisciplinary teams wherever practical to determine impacts, define and evaluate all reasonable alternatives to proposed actions, and assess short-term versus long-term productivity with and without the project or action.
5. seek common, adequate, and sound technical grounds for communication with and respect for the contributions of other professionals in developing and reviewing policies, plans, activities, and projects.
6. determine that the policies, plans, activities, or projects in which I am involved are consistent with all governing laws, ordinances, guidelines, plans, and policies, to the best of my knowledge and ability.
7. encourage public participation at the earliest feasible time in an open and productive atmosphere.
8. conduct my professional activities in a manner that ensures consideration of technically and economically feasible alternatives.

ENCOURAGE DEVELOPMENT OF THE PROFESSION:
As an Environmental Professional I will:
1. assist in maintaining the integrity and competence of my profession.
2. encourage education and research, and the development of useful technical information relating to the environmental field.
3. be prohibited from lobbying in the name of the Michigan or National Association of Environmental Professionals.
4. advertise and present my services in a manner that avoids the use of materials and methods that may bring discredit to the profession.

From: "Michigan Association of Environmental Professionals" brochure.

WORKING FOR THE ENVIRONMENT - SERIES II

This was the second series of four concurrent panel sessions -- two featuring speakers from environmental protection fields and two from resource management areas. Each panel included a moderator and three speakers. The ninety minute (1:30 p.m. - 3:00 p.m.) sessions were designed for each speaker to give a twenty-minute presentation followed by a twenty-five to thirty minute question and answer period.

Each speaker was asked to address the following three areas:

1. The role of the environmental professional in your organization.
2. The environmental issues you see as important now and in the future and the challenges they present for an organization like yours.
3. Advice for the college student or recent graduate who wants to work on environmental affairs for an organization like yours.

In arranging the panels, environmental protection was defined as work related to air quality, water quality, solid waste management, hazardous waste management and environmental health. Resource management was defined as work related to fisheries, forestry, wildlife, land and water conservation, parks and recreation, urban and regional planning.

This series of panels was coordinated with the morning series to allow participants exposure to a diversity of speakers or to enable them to concentrate on speakers from a particular sector (e.g. corporate, government, nonprofit).

Working for the Environment - Series II

A. Environmental Protection

Moderator - Connie Ruth, University of Michigan, School of Natural Resources

Mr. James Hunt, Chief of Compliance Monitoring Section, Hazardous Waste Program, Indiana Department of Environmental Management, Indianapolis

Mr. Hunt is responsible for the inspection of all hazardous waste generators, transporters and treatment facilities. He has also been in charge of licensing haulers of liquid wastes and directly involved in the clean-up of hazardous waste sites.

Mr. Hunt earned an A.B. in biological science at Indiana University and is a member of the Marion County (Indiana) Recycling Commission.

Mr. Michael Rio, Manager, Environmental Services, Michigan Division, Dow Chemical U.S.A., Midland, MI

Mr. Rio oversees all waste treatment facilities for Dow's Michigan Division which employs 5,000 people manufacturing over one-hundred different products. These facilities include a hazardous waste landfill, wastewater treatment plant and incinerator. His staff handles all work related to state and federal environmental permits.

Mr. Rio has been with Dow for fifteen years, including five years with Environmental Services. His duties have included coordinating Dow's efforts to control dioxin. He has a B.S. in chemical engineering from the University of Houston.

Mr. Roger Westman, Air Pollution Control Manager, Allegheny County Health Department, Pittsburgh. PA

Mr. Westman's responsibilities include planning, establishing management objectives, budgeting and program review. He does the planning for new or revised state and federal air pollution programs, such as hazardous pollutants, New Source Performance Standards and Prevention of Significant Deterioration. His accomplishments include the development of the county's portion of the State Implementation Plan to control air pollution and the complete rewriting of all county air pollution control rules and regulations.

Mr. Westman earned a B.S. in chemical engineering from Northeastern University (MA) and a Ph.D. in chemical engineering at the University of Kentucky. He is a member of the Air Pollution Control Association's Fugitive Emissions Committee, the American Institute of Chemical Engineers, and The Sierra Club.

Highlights

All three speakers expressed their enthusiasm for the environmental fields. They outlined the diversity of opportunities for professionals, including the need for a "general practitioner". This is someone who has not necessarily specialized but has good a foundation in a number of disciplines and can integrate all those fields.

Roger Westman with many years of experience at the local government level stated that local agencies offer unique experience and opportunities for growth. In searching for government positions, he encouraged persistence. Mr. Westman also emphasized the importance of preparing oneself to come to the work force with a marketable skill.

James Hunt, who is with a state regulatory agency, said the environmental field is full of challenge and opportunity. He described three challenges: (1) The need for more innovation in developing and applying technologies to address environmental problems, (2) integrating economics with environmental protection, and (3) improving communications and trust between the public and regulators. He advised participants to be sensitive to the opportunities presented by these challenges.

The third speaker, Mike Rio from Dow Chemical, described his company's policy: "The best way to handle waste is not to make it in the first place." Where disposal is the only alternative, Dow has state-of-the-art facilities and strict standards for handling waste. Mr. Rio also outlined the range of professionals necessary for Dow's environmental activities.

Presentations

Dr. Roger Westman began by stating that a regulatory agency is created with a mission supported by the law. His agency, the Allegheny County Air Pollution Control Bureau (of the County's Health Department),was created as a result of the U.S. Clean Air Act of 1970. Besides the U.S. EPA, there are fifty state agencies and over two-hundred local agencies responsible for implementing and enforcing The Clean Air Act. Mr. Westman advised participants to consult any April issue of the Journal of Air Pollution Control Association for listings of all these different agencies.

The purpose of his agency, Mr. Westman said, is to implement programs, monitor compliance and enforce strategies to assure that the Pittsburgh area is meeting standards for clean air. He cited that Pittsburgh many years ago used to be known as a "smokey city", now it has been recognized as "America's No. 1 most livable city." The Clean Air Act implemented through his agency played a role in this transformation.

Mr. Westman said that a regulatory agency may have only five or as many as 500 people, but typically employs from 10 to 70 people. The largest job category in his agency is engineers: industrial, chemical, mechanical or environmental. These comprise about one third of the staff. But an agency's task is also to monitor and analyze so they employ chemists, mathematicians, electronic technicians, computer programmers and meteorologists. There are also opportunities for journalists and attorneys with a technical background.

Their first hiring priority tends to be other agency people. Others are drawn from the pool of those laid-off or retired from industry. New graduates can also find opportunities within regulatory agencies.

The issues they faced, Mr. Westman said, are in the general areas of regulation, enforcement, administration and supervision. The Clean Air Act has given them a specific mandate in the area of air pollution. Much of it involves idustrial emissions where continuing vigilance is required to assure compliance. There are also the issues of ozone, airborne toxics and accidental releases. Mr. Westman said we have yet to contend with the problem of acid rain and it "won't go away until Congress does something about it." The emphasis on energy efficiency has led to air tight homes and raised awareness of indoor air pollution. The removal of asbestos from buildings is also an issue.

In searching for positions, Mr. Westman advised the group to remember that government agencies move slowly. He encouraged persistence. Mr. Westman also stated that it was important to prepare oneself to come to the work force with a marketable skill "to fit a slot." Local agencies have the disadvantage of a lower pay rate, but they offer unique experience and opportunities for growth.

The second speaker, James Hunt, who is with a state regulatory agency, opened by saying the environmental field is full of challenge and opportunity. "If I can accomplish anything today, I want to leave you with that thought," he said.

Mr. Hunt defined the role of the environmental professional as simply "to protect human health and the environment." There are many academic disciplines that are involved collectively to perform this role. They include the environmental scientist or specialist, which is the general practitioner of the environmental field, as well as more specialized disciplines, such as geologists, chemists, engineers, toxicologists and others.

To set the scene for a discussion of environmental challenges, Mr. Hunt provided his insight on the evolution of environmental protecton in this country. In general, this development has been rather fragmented with insufficient attention given to other parts of our ecosystem and our society as a whole. For example, air pollution was abated by removing contaminants as liquids or solids with little consideration being given to proper disposal of the contaminants. Likewise, water pollution was controlled by removing contaminants from wastewater and generating huge volumes of sludges, again without adequately addressing disposal. Mr. Hunt said that today we are getting closer to long-term solutions such as waste minimization and recycling. We are also now re-examining approaches and policies to handle complex problems like toxics.

Mr. Hunt went on to outline the challenges for the environmental professional of the future.

The first challenge is the need for more innovation in developing and applying technologies to address environmental problems. Mr. Hunt cited the example of removing solvents from contaminated soils by using compressed air with the solvent absorbed into activated carbon. This innovation helps to avoid landfilling the contaminated soil.

The second challenge is that of integrating economics with environmental protection. Mr. Hunt said that just as a faltering economy can hamper environmental protection, so can inadequate environmental protection restrict economic growth. For example, the City of Indianapolis' non-attainment of certain air quality standards is deterring the location and expansion of industry.

The third area of challenge, Mr. Hunt cited, was that of improving communications and trust between the public and regulators. There needs to be an effective dialogue between these two parties so we can become more "adept" at decision-making that involves weighing costs in terms of dollars against health benefits and environmental protection.

Mr. Hunt concluded by advising participants to be sensitive to the opportunities presented by these challenges. There is a need for fine tuning our capabilities in the scientific disciplines as well as a need to integrate and adapt other disciplines, such as public relations, communications and economics into environmental protection approaches.

Mike Rio, the third speaker in the session, began by saying that through his work at Dow Chemical he has seen the environmental arena grow and change. This adds to the excitement of being an environmental professional. He continued by describing Dow Chemical, which is based in Midland, Michigan. They manufacture many petroleum based products including some well-known plastics like Saran Wrap and Ziploc Bags. Dow also produces aspirin, thickeners for salad dressings and personal care products. They are the fourth largest employer in Michigan.

Mr. Rio said that communication between the chemical industry, the public and government is "lousy" and is a large and growing issue. This has created an image problem for Dow, which considers itself a safe company. He said it is now safer to work in the chemical industry than it is to stay at home.

Dow has an ongoing program to increase efficiency and decrease waste. Their policy is "the best way to handle waste is not to make it in the first place." Wastes are therefore recycled as often as possible or an attempt is made to develop new products made from these wastes. Where disposal is the only alternative, high temperature incineration is often used, plus Dow has an on-site solid waste disposal system. The landfill at their Midland complex is a "state of the art design." In 1984, Dow also established its own waste water quality restrictions that are the strictest in the world. They have maintained full compliance with these standards.

Since communication and public understanding are very important, Dow has now made public tours of its facilities available. They have also established a program in Midland for the collection of household hazardous wastes.

Mr. Rio said that Dow has many opportunities for the environmental professional. In the regulatory group, there are people working in the areas of air emissions and control technology, waste water treatment and hazardous waste management. These professionals help Dow keep informed on the laws and regulations pertaining to environmental protection plus handle the acquisition of permits and monitor compliance.

In the area of environmental operations, Dow employs chemical engineers, chemists and environmental engineers. The environmental laboratory employs mainly chemists and lab technicians.

The chemists, engineers, biologists and industrial hygienists are mostly recruited from other areas of Dow into the environmental division. "To work for Dow," Mr. Rio concluded, "you have to learn the company. We want people who understand the company."

Questions and Answers

One question focused on how to "get into" a state environmental protection agency. It was suggested that one good way is through a student intern program. For example, the Michigan Department of Natural Resources (which is also the state "EPA") has such a program. To become involved, you go through the state's civil service. After applying, you are placed on a list. Everytime there is a part-time opening anywhere in the state government, you receive a job description.

Mr. Rio was asked about whether it was his department or a manufacturing process engineer who becomes involved in recycling and using waste products to make raw materials for alternative uses. He responded by saying the process engineer takes the initiative. Dow has developed a philosophy that it is poor business practice to make waste. Raw materials that end up as waste products is a loss of money; disposing of this waste costs even more money. Thus by avoiding waste, the company saves money. All manufacturing operations in Dow are encouraged to minimize waste.

During the question and answer period, Mr. Westman added a note of encouragement for liberal arts majors or those with general backgrounds. He emphasized there is a need in environmental protection for many disciplines and skills. A "general practitioner in the environmental profession" is also required. This is someone who has not necessarily specialized but has a good foundation in a number of disciplines and can integrate all those fields. Mr. Westman said that the government sector would probably have more need for the general practitioner than the corporate sector. However, the positions are there. Your salary may not be quite as high as that of an engineer or chemist, but there is a need for you.

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B. Environmental Protection
Moderator - Lee DeAngelis, The CEIP Fund

Mr. William Richardson, Chief of the Large Lake Research Station, U.S. Environmental Protection Agency, Grosse Ile, MI.

Mr. Richardson is responsible for this laboratory which conducts research on the sources and effects of chemicals in the Great Lakes. His previous work included research in mathematical modeling, studies of the Delaware Estuary and enforcement work on the Detroit River. He has worked for the U.S. EPA and its predecessor agencies since 1963. He was a Commissioned Officer in the Public Health Service.

Mr. Richardson has a degree in civil engineering from The University of Michigan. He is an Environmental Engineer and a Professional Engineer in the State of Michigan. He is a member of the International Association for Great Lakes Research, The American Society of Civil Engineers, and the National Society of Professional Engineers.

Mr. Ralph Feeney, Regulatory Analyst, Amoco Corporation, Chicago.

Mr. Feeney's responsibility is to provide assistance to operating subsidiaries for their environmental planning and in the obtaining of permits for new projects. He has coordinated the environmental programs necessary for permit acquisition for several major energy projects in the western United States.

Mr. Feeney is a member of the American Petroleum Institute and the Chemical Manufacturers Association. He has a B.S. in biology from DePaul University and a M.S. in natural resources from the University of Michigan School of Natural Resources.

Mr. Robert Staib, Education Director, Council on Hazardous Materials, Cleveland.

Mr. Staib is responsible for the coordination of community information programs, speaking to school classes and community organizations, and is in charge of the Council's Resources Center. His background includes seven years as a Social Worker with juvenile court.

Mr. Staib has earned a B.S. in History and Politics at Drexel University and a Masters in Social Service Administration from Case Western Reserve University.

Highlights

Representatives from private industry, nonprofits and the federal government presented their views on their specific fields, current environmental issues, and possible career paths for future professionals in this presentation on environmental protection. After completing their presentations, speakers William Richardson of the U.S. E.P.A., Ralph Feeney from Amoco Corporation, and Robert Staib of the Council on Hazardous Materials, entertained questions from the audience.

Although each of the three men had a different perspective relative to his position, several common themes were apparent. Each man has drawn on interpersonal skills in dealing with difficult situations in his job. Technical expertise is another important foundation which is practiced routinely. Flexibility and adaptability to new ideas and experiences can be vital attributes for the successful environmental professional.

The three speakers also agreed on environmental resource issues which will develop or remain as important. Groundwater supply and contamination regulation, acid rain legislation, and new pollution monitoring techniques were all cited as topics which will continue to receive national attention in the years ahead. New developments in these areas will continue to provide employment and may generate new positions as research and discoveries continue. Each of the men referred to the high degree of existing competition in environmental professions. Each recommended a strong background in chemistry and other hard sciences, and an open mind when looking for employment in an environmental field. Maintaining realistic expectations while maximizing opportunities and making contacts was cited as a positive strategy. Each speaker stressed the he did not start his career in a well paid or prestigious position, but that by keeping his options open and working at whatever available environmentally related task, other opportunities eventually presented themselves.

Presentations

Mr. William Richardson, Chief of the Large Lake Research Station at Grosse Ile, Michigan, described the U.S. Environmental Protection Agency as an agency which performs two major tasks. First, it must reduce or eliminate harmful and unlawful types and amounts of pollutants from the environment. Second, it regulates the discharge of pollutants by granting licenses to corporations which meet legal requirements necessary for controlled release of pollutants. These tasks must be undertaken with the awareness of legal, political, and social ramifications. Because of the many involved parties, it is rare that an E.P.A. ruling does not offend someone. Many areas are vague or new, and often an agency like the E.P.A. finds itself in the middle, with everyone against it.

The Grosse Ile Station conducts most of the research done on the Great Lakes that is needed by other E.P.A. offices for regulation purposes. Of this, two-thirds is contracted to private firms, for both on and off site testing. The remaining one-third is on-site and conducted by in-house researchers. Results include pinpointing sources of incoming pollution and identifying the effects of chemicals entering or remaining in the system. Much of the research pertains to public health. Research has a multidisciplinary angle; scientists attempt to trace pollutants coming from the atmosphere, and follow their paths into water and the sediments. Predictions are derived from cause and effect mathematical models designed at the station, and findings go to Washington.

The staff on the island consists of approximately 25-30 individuals, including on-site contractors. Permanent positions include chemists, biologists, toxicologists, and computer specialists, each with degrees ranging from the Bachelor to Doctorate level. Two types of research positions are currently in force. Scientists, each assigned to a specific group project, work in a specialized capacity at the station. Project officers, or scientific managers, oversee research projects. Researchers at any level must possess flexibility and the ability to work effectively in a group setting when involved in a federal program like Large Lake's.

Employment in the E.P.A. at the research level allows advancement to the GS-16 level, which has a salary range of $61,296 to $77,640 per year. Research positions are most readily available to those with strong backgrounds in chemistry and other hard sciences. Managerial positions require experience and education in a variety of areas such as marketing, business and some technical expertise.

Mr. Richardson's advice to those interested in a government career was to try conventional and nonconventional ways to increase exposure, experience and contacts in the field. He expressed the thought that although many positions depend on being in the right place at the right time, the chance of that happening is determined by the amount of effort put forward in the employment search. Some specific ideas included becoming listed on the Federal Registry, joining professional organizations, and establishing as many personal contacts as possible. Perseverance and ingenuity are both valuable traits for the future environmental professional.

A representative from Amoco Corporation was the next speaker. Mr. Ralph Feeney, Regulatory Analyst, described Amoco as an integrated resource company. Its processing of oil starts with exploration, and continues through drilling, transporting (by air, sea, and across the country by rail), refining and ends with retail selling. Because of this, Amoco subsidiaries and concerns are far-reaching, and environmental management exists at all levels. Mr. Feeney outlined the workings of Amoco environmental regulation at three levels; the plant level, the subsidiary level, and the corporate level, each with its own concerns and staffs.

At the plant level, chemical facilities and refineries require on the scene supervision to facilitate adherence to environmental regulations. Depending on the size of the facility and its particular processes, this could mean one person or an entire environmental staff providing constant checking to maintain environmental quality. People in these positions must also be aware of state and municipal law to avoid violations, and often they act as a liason between the plant and government officials at every level. To allow for current techniques in environmental control, the resource specialist/staff has individual budgets and great latitude in decision making and enforcement, along with the corresponding responsibility.

Environmental coordinators work at the subsidiary level. Engineers and biologists largely comprise the staffing at this level. Coordinators must be aware of current and developing regulation and legislation, as well as keeping abreast of new environmental issues and roles. Their job includes keeping the subsidiary vice president apprised of problems and developments in any of their plants. Another requirement is their knowledge and understanding of daily activities and politics at both the plant and subsidiary level. When he was a Project Environmental Coordinator, Mr. Feeney's area of concentration was in obtaining resource exploration permits. He negotiated with agencies such as the Environmental

Protection Agency and the Bureau of Land Management for new permits, and also coordinated any existing permits with the involved agencies. Once a permit was obtained, Mr. Feeney was responsible for engaging contractors, reviewing contracts, and acting as a liason between agencies and a project staff. Currently he works in Regulatory Affairs for Amoco, monitoring federal proposals and legislation and reporting their effects on subsidiaries, plants, etc.

Mr. Feeney sees topics such as resource monitoring, groundwater management, and acid rain regulation as developing issues in the future. Biostatistics as a means for interpreting samples into relevant predictions of environmental problems is in demand and looks promising for the future. Legislation involving national problems such as acid rain and depletion and contamination of groundwater supplies is imminent. Related areas such as hydrology are also developing.

Mr. Feeney also predicts that soon health problems and concerns will overshadow issues such as wildlife preservation. A change in attitude to "How do toxics and pollution affect me?" from "How does pollution affect the forest?" will shift the emphasis in environmental employment toward epidemiologists, toxicologists and other public health professionals. Employment in private industry will remain competitive due to a trend towards consolidation of regulations in air, water and hazardous waste treatment.

Finally, Mr. Feeney expressed his satisfaction regarding his experiece with Amoco. He pointed to their own annual environmental conference held for subsidiaries and the corporate level as a positive step. He predicted that with the advent of more regulation, private companies like Amoco will increase their environmental awareness (by increasing their staffs) in the future.

The final speaker, Robert Staib, expressed views and commented on experience from the nonprofit sector. His title, Education Coordinator, only partially defines his role at the Council on Hazardous Materials in Cleveland, Ohio. Like most nonprofit organizations, the amount of work to be done requires employees to serve in many capacities.

Because he and one other person compose the entire full-time staff of the council, they alone are responsible for establishment and implementation of programs, and they answer directly to a twelve member board of trustees. Mr. Staib defined their primary goal as consciousness raising of individuals and corporations on environmental issues. Their office is located in an industrial urban area, and provides them with a variety of issues which need their attention. They are a non-governmental community education center which receives funding from individual contributions, the Cleveland Foundation, the United States Environmental Protection Agency, and the George Gund Foundation in Cleveland. Their major concerns involve toxic substances and hazardous waste in the community, in industry and in the home. To most effectively address these issues, the council has divided its attention into the following categories: education, service, technical assistance, community organization and advocacy.

The education program is subdivided into several projects. Included in these is the Hazardous Materials Hotline, a telephone service which supplies information and referrals to individuals who call. The Outreach Program provides written information and presentations to schools, unions, and community organizations. Newsletters and fact sheets keep people informed on developments in safety, health and environmental issues. The education program is designed to interpret complex issues so that people can understand and apply the information, and to make this information available to those who want it.

The service program arranges for proper disposal of household hazardous waste. With the E.P.A. grant, the council can hire a licensed contractor to collect the most hazardous waste on scheduled pick-up days. This provides individuals with a convenient means for proper disposal of household chemicals.

Technical assistance is available for communities located near chemical plants or hazardous waste facilities. Coordination of emergency services such as police and fire departments, evacuation drills, and distribution of fact sheets in affected neighborhoods are some of the ways the council helps people to be aware and informed. In the event of a leak or catastrophe, the council can assist with informal counseling to allay fears and tell people what to expect regarding health problems, etc.

Fundraising is one of the most important aspects of any nonprofit organization. In order for the council to remain active, funds are always needed and are sought from industry, communities, and grant programs.

The role of an advocate is sometimes exercised when a specific issue arises. The council has joined with other environmental organizations in the past to oppose actions such as permission to establish a sanitary landfill near the Cuyahoga Valley National Recreation Area (OH).

Participation in any of these areas is common for a nonprofit environmental organizations. Because of the diverse nature of nonprofit involvement, Mr. Staib recognized that no one educational background was necessary for nonprofit employment. However, because hazardous waste is such a common topic, he advised a strong background in hard sciences such as chemistry and biology. Other attributes important in the nonprofit sector include experience or education in policy and communication. Volunteer and community work can help, too. A combination of technical and communication skills and dedication is important.

Nonprofit environmental groups have several challenges in common. There is a constant need for funds, which vary in availability. With an informational organization such as Mr. Staib's, workers are always trying to keep pace with new issues and developments. To be successful, there must be an underlying established trust between communities and the nonprofit group, as well as a reputation of factual and unbiased information to avoid allegiance with one side during controversy. To meet these challenges, workers must remain flexible and innovative in their approach to new projects. The future nonprofit environmental professional will need a dynamic attitude to meet these challenges.

Questions and Answers

Questions from the audience were on current environmental issues, advice on employment and technical questions relative to the speaker's area of expertise.

Those questions regarding environmental issues included alternative energy, and the safety of underground storage tasks. Mr. Feeney addressed the first two questions saying that while there has been some leaking of underground storage tanks at retail service stations, increased monitoring and installation of tanks made of better materials are more likely solutions rather than different storage systems. Alternative energy source exploration depends on the state of oil availability and prices. Because of current low oil prices, alternative research is in a "maintenance mode"; no new advancements are expected in the near future.

The audience had several questions regarding employment and qualifications in different environmental areas. Concerns regarding the inability to acquire experience yielded several ideas from the panel. Mr. Feeney and Mr. Staib advised future professionals to take any environmental position available and use it as a stepping stone to better offers. Mr. Richardson added that dedication and persistence would lead from routine entry level positions that may not be challenging to more attractive positions. Mr. Feeney also commented that forestry and mineral exploration do not offer the openings that they once did in private industry.

Follow-up questions regarding Mr. Staib's presentation centered on some of his organization's current programs. He addressed the issue of liability in hazardous household waste pick-up by advising other nonprofit groups to use municipal hauling facilities because at present, private insurance is impossible to maintain, due to the catastrophic consequences of a spill. Regarding the possibility of providing misinformation in a fact sheet, he commented that there is standard protocol, which if followed, can prevent confusion and liability. Procedures such as checking informational sources and advising readers of limitations are all necessary in maintaining credibility.

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C. Resurce Management
Moderator - Terri LaMarco, University of Michigan

Mr. Harry Conard, Manager of Planning and Policy Development, Department of Community Development, City of Cleveland

Mr. Conard's responsibilities include the development of plans for the use of federal block grant funds and the preparation of block grant applications. This includes assuring that projects meet environmental rules. Previous positions he has held includes Executive Director of the Kamms Area Development Corporation, Cleveland; Program Manager for the Central Puget Sound Economic Development District, Seattle, WA; and Technical Services Specialist for the Conset Corporation, a Washington, D.C. management firm. In the latter position, he worked on public infrastructure improvements.

Mr. Conard has a B.A. in government from MacMurray College (IL). He was also a VISTA volunteer working on sanitation projects and the founding of a health clinic in Lee County, Arkansas.

Mr. James Bernard, Assistant Director, Michigan Great Lakes and Water Resources Planning Commission, Lansing

Mr. Bernard is coordinating the development of the state's first comprehensive water resources management plan focusing on the Great Lakes, surface waters and groundwater and water use. His previous positions include being the natural resource management specialist for the Great Lakes Commission and environmental issues coordinator for the Ecology Center of Ann Arbor, MI.

He has a B.A. (triple major) in political science, cultural anthropology and environmental studies at the University of California/Santa Barbara. Mr. Bernard will receive a M.S. in December, 1986 in resource policy, economics and management from the University of Michigan School of Natural Resources.

Ms. Christine Branson, Private Consultant, Conflict Management and Risk Assessment

Ms. Branson assists public and private organizations in dealing with resource management problems related to the use of air, water and land. She specializes in assisting resource managers on risk assessment and managing conflicts over resource use. Besides consulting, Ms. Branson teaches courses in environmental conflict resolution and organizational theory and change. She is affiliated with the University of Michigan School of Natural Resources Environmental Conflict Management Project.

Ms. Branson has worked as an environmental engineer at Dow Chemical specializing in environmental assessment and at General Motors/Cadillac Division where she coordinated their hazardous materials management program. She has a B.S. in chemical engineering from the University of Michigan (U-M) and is pursuing both a M.S. in chemical engineering and Ph.D. in socio-technological planning from U-M.

Highlights

The panel members provided a diversity of perspectives on resource management careers, issues and advice for future professionals. Common to all three speakers was the idea of a multi-disciplinary approach to an environmental career. Contemporary resource management positions will demand technical specialists who take a holistic approach towards their work, incorporating both technical and social factors into problem solving.

Another common characteristic of future resource management professionals is that of dedication. Environmental careers demand people who have a strong ethical commitment to environmental integrity, and people who are willing to make personal sacrifices. For example, Mr. James Bernard commutes 120 miles a day (round trip) for his job with the state of Michigan. Ms. Christine Branson, another panel member, maintained a commuter marriage for three years so she could pursue her career. Mr. Harry Conard commented that future environmental professionals usually get sidetracted from their intended carrers when entering the environmental field. However, dedicated individuals can work their way towards their career goals through perseverance and innovation.

Presentations

Mr. Harry Conard, Manager of Planning and Policy Development for the City of Cleveland, Department of Community Development opened his remarks by pointing out that his position is under heavy political influence, more so than a technically-oriented employee in resource management. Federal block grants, for which Mr. Conard is responsible, are highly flexible and often far short of demand for funding. He said that under such financial situations, jobs and money are at the whim of the "ruling organization"; in his case, the Cleveland City Council. Mr. Conard after this preface turned to traditional resource management within Cleveland.

"Typical" environmental problems, such as toxics, are present in the Cleveland area and these problems have extensive effects on political and policy decision making. At a more specific level, Mr. Conard introduced resource variables he must incorporate in his position as a community developer for the city. Space is a central focus for an urban planner and is highly impacted by several factors. First, zoning regulations are the "management plan" outlined for urban planners. Zoning regulations, or permitted uses, are set by the City Council and are strictly enforced. Mr. Conard introduced the term "land compatability", how buildings fit into their environment. He believed that land compatability must be looked at as an environmental quality issue, and must be quantified for legal enforcement.

Mapping of city lots is a critical resource. Presently, Cleveland is updating its mapping system by putting lot information, such as building material, foundation structure, location of fire hydrants, etc., onto a computer system. Below ground concerns and soil preparation are especially important as a resource because of land redevelopment costs within the city. Finally, central transportation, specifically light rail in Cleveland, impacts urban planning and must be looked at by urban planners.

For those interested in working for a city in resource management, Mr. Conard recommended reviewing the City Record, an annual publication put out by all municipalities. Such publications include specific department budget estimates plus what positions are going to be needed according to title and salary. He revealed that such records aren't the easiest to find and decipher, yet these publications have a great deal of information.

Mr. Conard went on to say that many people do not realize that city governments provide a range of environmentally related positions. While there are some fifty environmental professionals with the city, over 150 employees have environmental skills, yet these people are involved in managerial or supervisory positions. Mr. Conard believed that the path towards an environmental career may not be straight but is achievable with persistance.

Lastly, Mr. Conard advised potential city employees to write to the Director of the Department where they are interested in working. Networking is also very important because job postings are not usually in obvious places. Many governments do have one bulletin board where openings are listed, so it is important to find out how a specific city recruits employees.

Mr. James Bernard of the Michigan Great Lakes and Water Resources Planning Commission contrasted his perspective as a state resource planner to that of Mr. Conrad. He termed his involvement with Michigan's first comprehensive water resource management project as ethereal compared to the trench warfare of municipal resource management. His specific program includes surface and ground water planning, land and water use, plus water quality and quantity planning for the state of Michigan. This was all to be completed in two years by five professional resource environmental professionals. Mr. Bernard points out that his commission avoided traditional planning procedures and opted for specific management recommendations. They identified approximately 125 water related issues which were grouped into eight priority categories for management plans. Mr. Bernard went on to say that water planning is difficult in the state because there is such an abundance of water resources.

As chief planner and staff coordinator, Mr. Bernard acknowledges that more women and minorities must be admitted into the environmental profession. He pointed out that his staff was unusual because there were three men and two women. His staff also made good salaries because they all had several years experience behind them.

As for future environmental issues, Mr. Bernard had several specific comments. He believed that federal level positions were too politically volatile and should be secondary to more effective work at the city and state level. Resource management positions dealing with hazardous waste will be growing in the future. Consulting firms, primarily asked to do engineering and regulatory work, will receive a good deal of money, especially from Superfund. At the entry level, air toxics will demand professionals in the field of air chemistry and monitoring and surveying. Water shortage issues will be big in the future in various regions, demanding innovative conservation and economic policy makers. Mr. Bernard emphasized groundwater as the most important of water-related issues in the future and promised that ground water hydrologists will be in demand. Environmental planners are making a come back, specifically positions will become available for those with Master's degrees. Risk assessment (the scientific based analysis of environmental issues) and risk management (involving cost-benefit analysis and political decision making) will be increasing. Risk managers will be most effective as private consultants, and must have their master's degree. Resource recovery, that is waste to energy systems, are going to demand environmental professionals in air modelling, scrubber technology, and recycling. Finally, environmental auditing, that is checking industrial processes and compliance with regulations in corporations, is increasing and may be best met from a consulting position.

Advice for graduates and near graduates includes taking state and federal civil service tests in order to get interviews. Mr. Bernard advised that technical and policy skills should be balanced. These skills are not mutually exclusive anymore. Communication and writing skills are essential. In addition, commitment to environmental principles is very important, despite the bureaucratic situations that may arise. Mr. Bernard suggested that future environmental professionals must learn how to raise funds, write contracts, apply for grants, and develop graphics. Finally, he recommended that practical experience positions are important and should be varied. Such positions open doors and introduce new contacts.

Ms. Christine Branson, a private consultant in conflict management and risk assessment, started out with generalizations she has seen as an environmental professional. First, she believes environmental professionals usually are willing to make sacrifices in return for careers that provide personal reward. Personally, she and her husband lived in separate apartments for three years and commuted on weekends because their jobs were in different areas. Secondly, she sees burn-out as a problem for corporate environmental profesionals who try to make changes in corporate environmental responsibility. She suggests that individuals must learn to review their work, their interests and even personal health while pursuing a professional environmental career.

Ms. Branson described her private consulting work as an approach towards today's need for "wiser" environmentally-related decisions. She divides this approach into two categories. The technical component, defining a wiser decision according to scientific information, will demand professionals in public and environmental health, environmental engineering, systems perspective, and risk perception. The second category is the social component of decision making which will demand professionals from planning, decision making, organizational theory, people skills and conflict resolution. Ms. Branson also supported the multi-disciplinary approach, especially within her field of decision making.

Ms. Branson believed conflict resolution as a major issue within her field. She believes that the more people involved will help make wiser resource management decisions. She went on to mention the three types of environmental conflicts: resource distribution conflicts, policy making conflicts, and standard setting conflicts. Her approach towards conflict resolution is labeled Alternative Dispute Resolution which means everything but litigation and regulation, our primary methods today. Ms. Branson went on to discuss trends within conflict resolution. Standardization and institutionalization of conflict resolution must be done to provide for greater and easier access. Funding for such institutions, such as foundations and/or state money must be resolved. Secondly, after standardization, licensing will be needed to certify professionals within the field. Finally, technical knowledge and conflict issues must be combined to have a multi-disciplinary approach for success.

Ms. Branson suggested three pathways to pursue careers in conflict management. First, grassroots disputes at the community level are easiest to become involved in and helpful for experience. Another level is the agency level, where city, state, and federal agencies mainly engage in alternative dispute resolution. Thirdly, private consulting provides conflict resolution for those who are willing to hire such professionals.

Finally, Ms. Branson suggested several tips for future conflict resolution professionals. Such a career demands a strong technical background, in Ms. Branson's case she had an undergraduate degree in chemical engineering, however, a strong theoretical background is also important. Organizational theory, change and intervention, and sociological theory are all important aspects. Conflict resolution skills are important and can be gained from workshops and conferences, such as those put on by the Society of Professionals in Dispute Resolution. Finally, communications and computer systems will be important in conflict resolution.

Questions and Answers

During the question and answer session several important, general points were made. One of these was the need for more minorities in traditional resource management positions. Mr. Bernard felt that the "good ol'boy" network was stagnant and hindered progress in the field. New perspectives, other than the sportsman user group, is needed.

When asked about specializing versus generalizing, panel members recommended that one should get a technical background to start. From the technical perspective one can then learn more generalist skills. Mr. Branson said that what is most valuable is the proper multi-disciplinary attitude combined with a strong technical background. Panel members advised that future environmetal professionals cannot count on one job in the environmental field. "Re-packaging" one's skills and experience to move into new areas may happen several times in an environmental career. Mr. Conard suggested that environmental positions are filled according to a person's "trainability" and job-specific criteria outside of coursework. The constant in all of this job variability is a strong ethical commitment to the environment.

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D. Resource Management
Moderator - Sandra Gregerman, The University of Michigan School of Natural Resources.

Mr. Adrian Achtermann, District Conservationist, Summit Soil and Water Conservation District, Cuyahoga Falls, OH.

Mr. Achtermann provides technical assistance to public and private landowners in soil and water conservation planning. He is also actively involved in working with schools in Summit County, Ohio on environmental education programs.

Mr. Achtermann has thirty-one years of experience with the Soil and Water Conservation Service in several counties in Ohio. He is Chairman, Evironmental Education Division, Soil Conservation Society of America (SCSA) and is past president of the Ohio Chapter, SSCA. He has a B.S. in agronomy from Ohio State University.

Mr. Jonathan Dreyfuss, Senior Analyst, Recycling Systems, Ann Arbor, MI.

Mr. Dreyfuss' experience includes supervising the renovation of historic buildings, founded and directed a free curbside recycling collection program, and served on an advisory committee overseeing the development of a county solid waste management plan. He has additional experience in designing specialized processing, storage, and collection equipment to reduce labor requirements for recycling programs.

Mr. Dreyfuss earned a B.S. in Natural Resources at the University of Michigan.

Mr. Thomas Woiwode, State Director (Michigan), The Nature Conservancy, Lansing, MI.

Mr. Woiwode's responsibilities include the acquisition of land, fund raising, and administrative duties. His previous positions include: Director of Legal and Economic Affairs for the Institute of Local Self-Reliance, Washington, D.C.; Special Projects Attorney, Montana Legal Services; and has taught business courses at the college level.

Mr. Woiwode has earned both a B.A.A. and a M.B.A. from Michigan State University and a J.D. from Detroit College of Law. He is a member of the Washington, D.C. and the State of Michigan Bar Associations.

Highlights

Mr. Adrian Achtermann explained the purpose of soil as a resource for various activities based upon its type, slope, the local weather pattern, and other environmental considerations. He stated the need for public education regarding runoff and the causes and effects of erosion. Many conservation districts do accept interns, but since the permanent staff changes, he said it is a good idea to keep in touch with the local district regarding internship opportunities. Conservation education needs to occur with a variety of people, including the mayor, city planners, legislators and the general public. Additionally, teachers should be trained so that they may then spread that knowledge out to their students. Mr. Achtermann said that entrance requirements for the Soil Conservation Service are competitive. Staff turnover comes from retirement, not from people leaving the job. Basically, one should have a strong science background, specifically including soils and agronomy. The remainder of the requirements is personal ability to deal with a variety of people on many levels.

Mr. Jonathan Dreyfuss of Resource Recycling Systems noted that as a consultant he has assumed many positions, including that of businessman, researcher, and data analyst. His studies have focused on a variety of environmental issues, dealing with everything from wildlife to erosion, and may include suggestions for formal and informal programs. Skills necessary include the ability to communicate in written language and orally to a variety of people and the ability to organize yourself and others. Consulting is a difficult field to enter and the future of consultants is based upon past projects. One must be willing to invest a great deal of oneself into the work at hand. In the near future, Mr. Dreyfuss feels his biggest problem will be trying to meet the demand for his services.

Mr. Thomas Woiwode from the Nature Conservancy began by stating that there is always a job available for a talented person with a nonprofit organization. Skills necessary for positions available with his organization include the ability to communicate well, to identify special features of an area which make it unique and worth saving, management of other people, fundraising and financial management plus the knowledge of the legal ramifications of certain activity. On smaller staffs there are more responsibilities than are available to larger staffed organizations. Volunteerism is a way to gain experience. Volunteers should always look to work in projects where they can produce quality, meaningful work.

Presentations

The first speaker, Mr. Adrian Achtermann, explained the purpose and the structure of the Summit Soil and Water Conservation District which is governed by appointed supervisors from the local government. Mr. Achtermann's role is to provide technical assistance to the conservation district. Development of the area has led to the loss of approximately one-half of the topsoil and has also depleted the water quality as the remaining topsoil is washed into local waterways. It is important to know the types of soils, the advantages and disadvantages of each type as well as the uses of each soil type. The slope of the area and the local weather patterns may significantly affect the movements of the soil.

Mr. Achtermann said conservation planning is emphasized when one is dealing with development of an area. Increased education is necessary to address the issues of soil runoff, erosion, the overuse of chemicals to control the environment, and general information regarding the capability of soil types to certain projects. Education can be achieved via radio, television, outdoor education, through a variety of environmental and home owners groups, and through the training of teachers in environmental issues.

Jonathan Dreyfuss, the second speaker, discussed how he works with a wide variety of people who are involved with solid waste management, from landfill operators to trash collectors. He conducts many personal and telephone interviews during the course of a study, as well as collecting and compiling data to be analyzed for the study. He was involved in organizing a recycling program in Ann Arbor and many of his studies result in reports which help local communities in planning recycling efforts. Due to the fact that landfill space is declining, but the amount of trash generated each year continues to increase, Mr. Dreyfuss feels that his studies are particularly important and his services will be more in demand within the near future. Some of the issues included in the consultation studies are the costs of collection and disposal of wastes as well as the environmental impacts of those options presented. Most policies are based upon economics, but due to the problems being experienced today, Mr. Dreyfuss feels that communities must begin to recycle. One of the problems is convincing people that this is not simply the "in" thing to do, but that it is necessary for the future.

The third speaker, Tom Woiwode, explained the work of the Nature Conservancy which buys unique tracts of land in order to preserve the natural integrity of an area. The land is then managed to protect the unique features. He said that there is a strong need for "people skills" in nonprofit organizations, due to the fact that one encounters a variety of individuals both inside and outside the organization. Mr. Woiwode recommended that volunteers or interns work on specific projects and strive to create quality work.

Mr. Woiwode went on to note that approximately 500 resumes cross his desk every year. Thus he stressed the importance of knowing how to write a resume and being able to sell yourself to an organization. He also suggested that you learn something about an organization so you can present yourself to the right person and show how your skills can meet their needs.

Questions and Answers

In response to a question regarding internships with nonprofits, Mr. Woiwode said many nonprofit agencies have project-specific work. If you are in a position to do so, be creative and create your own project. He suggested that environmental organizations through their newsletters and magazines advertise positions.

Mr. Woiwode also stressed that there must be some commitment to an organization. Many nonprofit groups experience the problem of training someone and then having that person go into a more profitable position somewhere else. The salary range for an entry level position can range from $16,000 to $30,000 per year. There are not many internships offered, but one does have the option of volunteering. Volunteer where you feel your skills would be best utilized. Independent studies may also offer opportunities to gain credit for a volunteer position. Mr. Woiwode also advised that you must invest hard work into a job search and be persistent.

In response to a question on the value of taking a semester off to gain experience, Mr. Achterman suggested trying to receive academic credit for the volunteer work you do. He recommended taking the federal civil service exam which is important in gaining a federal position. It may even help at the state, county, or local level. Mr. Achtermann noted that the starting salary for a soil conservationist is in the $13,000 to $16,000 range, although engineers will start slightly higher. Even though the salaries are not the highest, he felt the work was very rewarding.

Advice on Finding Your First Permanent Position as an Environmental Professional

This section of the conference was a series of three concurrent sessions featuring professionals in their first environmental positions. Each forty-five minute session (3:15 - 4:00 p.m.) had one speaker who was asked to focus on the following:

1. Techniques for finding that first permanent position with organizations like yours including advice on researching and approaching organizations, formal (and "informal") application procedures that should be followed and the types of training and any experience required.
2. Advice on ways college students can better prepare themselves in school for what they will encounter in the working world of the environmental professional.

Each speaker gave a twenty-five to thirty minute presentation followed by a fifteen to twenty minute question and answer period. The three sectors we chose to highlight were federal government, state government, and corporations.

Federal Government

Ms. Anne Rowan, Public Affairs Specialist, U.S. Environmental Protection Agency, Region 5, Chicago

Ms. Rowan's responsibilities include many facets of public affairs. In addition to writing press releases and brochures, she does public involvement work with both private citizens and local government officials. One assignment has included interviewing officials at the local government level for their comments on the permitting of hazardous waste sites.

Ms. Rowan's past experience has included working for a Chicago news wire service, for the Chicago Sun Times as a "stringer" and for a law firm as a para-legal. She earned a B.A. in English from Marquette University and a M.S. in journalism from Northwestern University.

Highlights

Although most people within the EPA are specialists, Ms. Rowan said there is room for generalists. Communication skills and a basic science knowledge are important. She emphasized that work with the federal government can provide valuable experience early in one's career.

Ms. Rowan advised that persistence is the key to finding federal employment. Cooperative education programs, internships or temporary positions with the federal government can make it easier to qualify for positions. She encouraged people to apply for any positions that interest them and to be active in making contacts and arranging interviews as ways to help an application.

Presentation

Anne Rowan's position is focused on mandatory citizen participation required for implementation of hazardous waste clean-up through the federal Superfund. She stressed that no matter what your position with the federal government, you are directly responsible to the people. Your salary is being paid by the taxpayer.

Ms. Rowan concentrates on a public education effort, which includes writing press releases, and talking with the elected officials, environmental groups and local residents. While trying to educate the public, Ms. Rowan notes that one must be careful to determine whether the subject is political or environmental, and notes that many issues become emotional. One of the best methods to relieve all of the emotional energy invested in issues is to educate people regarding the facts.

Although most people within the EPA are specialists in a given field, Ms. Rowan said there is room for generalists. Communication skills and a basic science knowledge are considered important, as well as the ability to "take the heat". Some of the duties involved in public relations are dealing with the media, public presentations, and various methods of education. One must be very well informed to answer the questions that arise, and one must be able to communicate the answer to people on different levels, whether they are elementary school students or government officials.

Ms. Rowan emphasized that government work can provide opportunities to take on responsibilities early in a career which can lead to significant experience. She said it is important to understand the regulatory process, as well as the bureaucracy and how it works to address environmental issues.

Positions with the federal government are very competitive, especially at the entry level. Ms. Rowan said that the EPA does not directly evaluate an application for employment, but various levels of management do so. The Office of Personnel Management within the federal government ranks candidates according to their score on the civil service exam. Preference is given to veterans. It is possible to work for the federal government through cooperative programs, internships or temporary positions. These experiences can make it easier to qualify for permanent positions. Ms. Rowan said the EPA hires chemical engineers, toxicologists, hydrologists, geneticists, meteorologists, doctors, veterinarians, attorneys and investigators, and environmental protection specialists.

Persistence is the key to finding federal employment, noted Ms. Rowan. She recommended checking for openings regularly and to meet people at the agency, if possible. You should stay in contact with these people on a regular basis. Ms. Rowan also discussed completion of the 171 Form (the federal application). She stressed that you should know the duties and responsibilities of the position for which you are applying and be able to illustrate your past accomplishments. You should highlight initiative and independence. Be specific as to how your education will help you perform in the position.

Ms. Rowan said the white pages of the phone book under United States Federal Job Centers can give you the location to review available positions. She suggested a regular review since the applications are only accepted for a limited time. You should apply for everything that interests you, but realize it may take from one to nine months to process an application. Thus, you should be active in making contacts and arranging interviews that could help your application.

State Government

Ms. Sharon Edgar, Environmental Scientist II, Ohio Environmental Protection Agency, Columbus

Ms. Edgar's responsibilities include the review of the water quality planning work of areawide coordinating agencies, the review of non-point source watershed studies, and general administrative planning. She also works on public participation in water quality issues.

Ms. Edgar earned a M.S. in resource policy and management from the University of Michigan School of Natural Resources. While in college, she was an Associate with EIP/Great Lakes and interned with the National Wildlife Federation.

Highlights

Ms. Edgar, who has worked for the Ohio EPA approximately for one year, offered several "tricks" and advice on getting into state agencies. She was very candid about her approach towards getting her position and how she felt about working for a state agency.

A specialized undergraduate/graduate education is important to most state agencies, according to Ms. Edgar. Internship experience is also important but equally valuable is with whom the internship is held. She believed that recognizable names are very valuable on a resume. She added that internships and extra-curricular activities should be varied yet somehow patterned to show a trend in interests when listed on a resume. Creative resumes that incorporate professional "buzzwords" are a good way to make oneself stand out in the review process. Finally, networking with contacts is always a valuable tool in finding a job.

In review of state agencies, Ms. Edgar pointed out both pros and cons. One advantage to employment with state agencies was a good deal of freedom for lateral movement among departments. State service also offered excellent opportunities for recent graduates looking for their first, permanent job. On the other hand, there is a high turnover of people in state service because many only work to gain experience before moving on to higher paying employers.

Presentation

Ms. Edgar's personal job search consisted of sending out unsolicited resumes to agencies in various Great Lakes states, a procedure usually not recommended. She picked agencies out of the Great Lakes Natural Resource Directory and sent each agency director of personnel a resume and cover letter. In her cover letter she asked for application information and for her resume to be filed should any job openings become available. Three weeks later she was called by Ohio EPA asking for a job interview. After three interviews with different agency staff, ranging from Assistant Section Manager to the Director of the Agency, she got the position. She later received two more inquiries from other interested employers.

Despite the fact that she knew she wanted to work at the state level, Ms. Edgar chose a general education, ignoring the advice of her professors and advisors. As it turned out, Ohio EPA looks for generalists who can be technically trained, but this is not the usual circumstance, said

Ms. Edgar. She advises that if one has a general education in natural resources, job searching should be aimed at state services with planning or policy offices. She felt that it was the creativity of her resume and the agencies she had interned with in the past that made her attractive to Ohio EPA. She creatively highlighted the names of the National Wildlife Federation, the Michigan Department of Natural Resources, and EIP (the Environmental Intern Program), organizations that she interned with, rather than her specific internship responsibilities. She also had found that her resume showed a trend in water quality projects that made her at least appear somewhat specialized in water quality. Ms. Edgar footnoted her presentation by saying that she probably would not be able to get her job this way today due to the recent unionization of Ohio state service employees. The unionization has greatly restricted state service jobs to entry level positions and prioritized seniority in higher job placement.

Another point to consider about state service, according to Ms. Edgar, is the range of vertical and lateral movement allowed. States differ in their agency structure which can be important in advancing one's career. As an example, Ms. Edgar points to the fact that to move up from her present position she would have to move into management, a step she does not wish to take presently. She will continue to receive periodic raises and increases in unofficial authority, but her career as a water quality planner is limited with Ohio EPA. She points out that this may not be the case in other states where there may be a greater range in state agency positions. Employment with a state agency is advantageous because it exposes one to a range of positions involved in environmental issues. Not all state agencies provide for easy lateral movement, but once in state government one has the opportunity to take advantage of positions available in state service. Other variables in state agencies include whether or not the state employees are unionized, and whether state agencies hire out of state employees. State agencies also differ in their hiring requirements. Some states have very specific job titles and only accept applications at the district offices. Others may not have such formal procedures.

Questions and Answers

When asked about job openings in the Ohio EPA groundwater program, Ms. Edgar said that many positions were open due to a recent lift on a hiring freeze. She added that most of the jobs are classified as Geologist I positions which pay approximately $15,000 at the entry level. Positions above entry level are restricted due to the unions. As for openings in management, she did not know how readily EPA was going to hire outside of the internal labor pool.

One conference participant wanted to know if there was any inter-state networking by the EPA agencies. Ms. Edgar responded that there was little direct networking except at certain technical areas. Most interactions among states happen through outside structures such as the International Joint Commission which works with the different state agencies on projects.

Important coursework for students interested in state service were environmental law courses, policy courses, and economics courses. She believed that her coursework wasn't what got her where she is today, but rather, the professional opportunities she got as a University of Michigan graduate student helped her obtain her position. Not to say that her coursework wasn't valuable, but she believes the university name is what really opens doors. As an example she revealed that she applied for an internship with the National Wildlife Federation three times; the first time as a Junior at Michigan State University with an excellent academic background. She was turned down but applied again after graduating from MSU and interning for six months with the Michigan DNR. Again she was turned down. After one semester in graduate school at the University of Michigan she was accepted. Competition for internships is very rigorous.

A final question dealt with Ms. Edgar's overall opinion of working for a state agency. She said that most people were strongly motivated. She thought the most frustrating aspect about both working for a state or federal agency is that while individuals may try to maintain a holistic or comprehensive problem-solving approach to their job, the agency itself is not set up in support of this approach. Any changes to a more unified system of solving environmental problems could mean that certain departments or sections are eliminated or given new duties. This could threaten people's jobs and therefore lead to resistance to better solutions.

Corporations

Ms. Elaine Price, Environmental Coordinator, Chase Brass and Copper Company, Cleveland

Ms. Price is responsible for all of the company's environmental protection programs. These include industrial hygiene, worker right-to-know, air pollution control engineering and permits for air and water pollution sources. While in graduate school, she served as an intern with the U.S. EPA in Washington, DC and was also an Associate with EIP/Great Lakes.

Ms. Price has a B.A. in biology and environmental studies (double major) and a M.S. in environmental science, both degrees from Indiana University. She is a member of the Water Pollution Control Federation, American Water Resource Association and the Sierra Club.

Highlights

Entering the environmental field can be difficult and knowing how and where to look for opportunities is critical. Advice from a successful professional can help answer some of the questions and allay the fears of the future professional. Ms. Elaine Price, Environmental Coordinator for Cleveland's Chase Brass and Copper Company, outlined what to expect from an industry job and how to prepare to search for one. Her unique experience in a position created for her because of new regulations has given her insight into this topic.

She listed typical positions found in industry, and the skills needed to perform the daily tasks involved in each. In addition, she explained the basic corporate structure of resource-based industries and where environmental positions are available. Finally, she suggested possible paths for people interested in private industry employment to follow.

Presentation

Ms. Price previewed her presentation with an explanation of her position at Chase Brass and Copper Company. Being Environmental Coordinator means being able to wear many professional hats. Since her job arose directly in response to Chase's need to comply with state and federal regulations, she has been given flexibility in program design and a large amount of responsibility. She handles everything from enforcement of OSHA* regulations to design of disposal procedures for hazardous waste at her facility. Since most industries attempt to minimize regulation costs, it is typical for them to hire one person to perform all related environmental tasks, instead of having a specialist in each area.

Typical positions available in private industry include:

Manager - These positions can be at the corporation, division, or facility level.

Specialist - Depending on the targeted industry, specialists may be needed for hazardous waste, air, water, emergency program development.

Technical Staff Member - This icludes chemists and biologists.

Public Affairs/Policy Staff Member - People in these positions are often known as liasons between contacts in Washington, D.C. and the company itself. They are aware of developing state and local environmental policy.

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* Occupational Safety and Health Act

Environmental Coordinator - These positions occur at the plant level. They involve hands-on work with plant activities, interaction with employees, program design and implementation, and application of laws and regulations at the plant level.

Technician - These positions are limited to research and testing in environmental areas.

Where do these positions fit in the corporate structure? The typical resource-based industry's structural design consists of the corporate headquarters, which monitors various sectors (specific areas of involvement such as oil, gas, etc.). Each sector is responsible for its division or companies. Divisions, in turn, monitor various facilities, each of which may be involved in a different aspect of processing a specific product. Ms. Price sees two alternating trends in environmental employment: centralization and decentralization. Currently, corporations are decentralized, with most or all environmental professionals at the facility level. However, there appears to be a shift by some areas of industry toward centralization in the future. This comes from a growing recognition that because many environmental regulations are similar for all areas of industry, a corporation can create uniform rules with a minimum staff to enforce them. The result is that fewer people will be hired and that those who are will be working from a main office, either at the corporate office or sector level, depending on the size and needs of the particular corporation.

Strategies for finding a position begin in school. Internships or coopeative programs were cited as being important opportunities, because companies receive work performed by qualified students and the opportunity to evaluate their performance and potential with no long-term obligation. Students are given a chance to prove themselves in a professional setting, to test their abilities, to make contacts, and to evaluate the corporate sector realistically.

Other possibilities include part-time research assistant positions in university work/study programs or in private laboratories. Fixed term employment as a technician can provide experience, perspective and valuable skills; however this type of position can be limiting, so it should be viewed as temporary if one wishes to explore other options. Full-time positions include those with a corporation at a facility or on a division or corporate level staff. Consulting firms also provide many permanent positions in the environmental fields.

Specific private sector areas in which to look include industrial and manufacturing firms, consulting firms, utility companies, and research and academic institutions. Academic requirements and experience vary for each organization, and may include degrees and experience in engineering, chemistry, biology and physics. Places to look for openings in these organizations include "help wanted" advertisements in trade journals and newspapers. Contacting a local Chamber of Commerce to receive a listing of private industries may yield possible employment opportunities. Positions are available for those with a strong academic background and the willingness to look for employment.

Ms. Price's main point was that there are traditional and nontraditional career possibilities and that ingenuity and ability go a long way toward opening employment doors. Academic backgrounds may delineate opportunities, but with the addition of experience, broader opportunities may exist.

Questions and Answers

Specific questions regarding the marketability of certain academic degrees and her view of women's roles as environmental professionals in industry were entertained. While biology degrees are highly marketable in some areas, they have limited applications in private industry. Consulting firms offer much more for biologists. However, biology combined with either chemistry or engineering are more marketable.

Regarding women as environmental professionals in private industry, Ms. Price feels that women have special obstacles to overcome. Employers in industrial environmental areas are traditionally male engineers and most prefer to have men on the job. Working at the facility level means daily interaction with plant personnel who are mostly male and have traditional views regarding women in authority positions. Ms. Price believes these challenges must be faced head-on, and with a sense of humor and an understanding that oversensitivity on the professional woman's part may result in problems. Many times the workers will take her lead in handling a situation that is new to them. She advises a no nonsense approach.

Special Presentation and Discussion

Mr. Robert Farrell, Retired Director of Health, Safety and Environmental Quality, The Standard Oil Company, Cleveland

Mr. Farrell's responsibilities included all corporate programs involving environmental affairs, industrial hygiene & safety, occupational health, product safety and toxicology. He began his career at Standard Oil in 1948 as a chemist. In 1965, he became Director of the Research Laboratory and in 1971 became Director of Environmental Affairs. From 1982 until his retirement in 1986, he headed Health, Safety and Environmental Quality.

Mr. Farrell is a member, Board of Trustees, The CEIP Fund. He is an active member of the American Chemical Society and served two years as Chairman of the Environmental Affairs Department of the American Petroleum Institute. Mr. Farrell is also a member of the American Association for the Advancement of Science. His B.S. in chemistry was earned at Boston College.

His presentation and discussion focused on: (1) The development of various roles for health, safety and environmental quality professionals in the corporate sector. (2) The health, safety and environmental quality issues corporations will face in the future and the career opportunities they present, and (3) Advice for students and recent graduates who want to work in the corporate sector or the government sector regulating corporations.

Highlights

Through his extensive career in the corporate sector, Mr. Farrell has seen increased corporate activity in the health, safety and environmental quality areas. Corporate staff and expenditures have grown dramatically over the last fifteen years to address protection and prevention issues. Today, health, safety and environmental quality are integrated so that corporations can more effectively act and respond to complex issues.

Mr. Farrell sees risk assessment as a key issue for the future in the corporate sector. Growing corporate expenditures for health, safety and environmental operations and maintenance is also a concern. The issues of hazardous waste, groundwater, and worker health and safety will also continue to be important.

There are many environmental career opportunities for those interested in the corporate sector. Mr. Farrell cited the need for analytical chemists, toxicologists, hydrologists, occupational physicians, risk assessment specialists as well as epidemiologists, biostatisticians, industrial hygenists and environmental lawyers.

His overall advice was to obtain a good, solid scientific education, like a B.S. in chemistry, engineering or biology. Mr. Farrell said industry experience would be valuable to those who wish to stay in the corporate sector or move to government. He stated that some of the best regulators in government agencies are those who have had industry experience.

Presentation

Mr. Farrell began by explaining the development of health, safety and environmental quality concerns in a corporation based on his experience with the Standard Oil Company. He said Earth Day, 1970 was a key time that raised everyone's awareness of the environment and effects of pollution. There was a focus on corporations and their roles and responsibility in environmental protection. Particular attention was given to the Standard Oil Company (SOHIO) since it was beginning its development of the oil fields and pipeline in Alaska.

Those "early days" saw Mr. Farrell become Director of Environmental Affairs with a staff of one person. His role was to review corporate policy in the environmental area and make sure it was being implemented around the country at SOHIO facilities. He traveled to all the facilities in order to understand the issues and prioritize where money should be spent to address problems. Working with other SOHIO departments like Engineering and Research and Development, Mr. Farrell played an important role in the construction of pollution control facilities and permit acquisitions. He also was involved in communicating with the various agencies being established to regulate corporations.

In the health and safety area, there were also very small staffs in the early seventies. There was one company doctor and each facility had a nurse. They primarily focused on making sure people were physically fit for employment. There were also safety engineers at the facility level in addition to one at the corporate level.

As regulation increased, SOHIO grew and concerns over health, safety and environmental issues continued, SOHIO's staff expanded to where there is now a staff of 58 in the corporate Health, Safety and Environmental Quality Department with another 120 staff people at the facility level. Mr. Farrell emphasized that besides these professionals, there are other staff involved. For example, corporate lawyers play a key role. Because of the complexity of environmental law and the severity of penalties for non-compliance, a company cannot afford to have scientists and engineers interpret the law. No major corporation could exist without good environmental lawyers.

Mr. Farrell explained that today the health, safety and environmental areas of a corporation have to be integrated. The days of a narrow professional view of the world are gone forever. For example, it is important for environmental engineers to understand toxicology and for toxicologists to know something about environmental engineering.

The way many corporations like SOHIO have taken a comprehensive approach to health, safety and environmental quality is through "auditing" corporate procedures and facilities regarding compliance. A corporate-wide policy was developed stating SOHIO's objectives on compliance. The company's Health, Safety and Environmental Quality Department is charged with implementing this policy. Auditing is a key means of putting the policy into action.

Mr. Farrell said that auditing accomplishes two important objectives. The first is that it protects corporate management and directors of the corporation from criminal and civil penalties that could result for not complying with the laws. Second, auditing helps facility managers understand the problems they have so that compliance can happen efficiently.

To illustrate the importance of auditing, Mr. Farrell highlighted that the Health, Safety and Environmental Quality audit team reports to the company's board of directors twice a year and whenever they feel it is necessary to report.

Finally, in regards to auditing, Mr. Farrell stressed the team approach to auditing for health, safety and environmental quality. The interaction among an industrial hygenist, toxicologist and environmental engineer, for example, helps assure that all aspects of a problem are addressed.

In the second part of his presentation, Mr. Farrell outlined the health, safety and environmental issues facing the corporate sector. The first one he raised was expenditures for capital equipment, operation and maintenance related to health, safety and environmental quality.

SOHIO spends about $100 million each year on capital equipment toward mainly environmental protection and prevention. This spending has remained fairly constant varying about $10 million each year. However, the areas where expenditures have really grown are in operation and maintenance related to health, safety and the environment. For example, seven years ago the budget for these areas was $100 million; this year it is up to $180 million. The big reason for the increase in these expenditures is the number of people it takes to operate a facility where there is today a much higher level of technology, more stringent permit conditions and measuring requirements as well as increased frequency of measurement.

Mr. Farrell said another issue is keeping the workforce healthy. Maintaining safe facilities for workers plays an important role. Another key SOHIO initiative is expanded health education and fitness programs for its workers. The company is also making efforts to control and respond to any spills or leaks that could lead to both worker and public health emergencies.

Mr. Farrell reiterated the issues of hazardous waste disposal and groundwater protection which were cited by a number of speakers earlier in the conference. A big question he said is "How clean is clean?" especially in light of the fact our ability to detect and measure toxins will allow measurement of smaller and smaller quantities. At what level will the public feel safe?

An issue Mr. Farrell chose to emphasize was risk assessment. He said that in order to deal with some of the problems, like toxic pollution, risk assessment has to improve. We have still not yet learned how to accurately translate results from animal testing to humans. Once we do make this relationship, we may be able to devise "quantitative risk assessment" that will enable us to make decisions without adversely affecting people, a company, and the economy.

Mr. Farrell cautioned that the media often conveys that risk assessment used by regulatory agencies, like the EPA, is fairly accurate. He said risk assessment is not as precise as people think. We still have to resolve questions before it becomes a meaningful tool.

The final topic of Mr. Farrell's presentation was related to the environmental professional opportunities he saw in the corporate sector. He emphasized the need for people trained in risk assessment as well as epidemiologists and biostatisticians to conduct studies on the health effects of chemicals on people. More monitoring for concentrations of chemicals is necessary, thus a need for industrial hygenists. Also in the health and safety area, Mr. Farrell said there is a lack of doctors trained in occupational health. Toxicologists would also be in demand as well as people trained in computer science that understand the health and safety area. All of these professionals are necessary so that the worker is protected and we understand the conditions of the employee and his/her exposure to any toxics in the workplace.

In the environmental area, Mr. Farrell said that analytical chemists are in demand because of all the testing and analysis necessary to comply with environmental regulations. Hydrologists are essential to any groundwater related problems. In addition, he referred to his earlier statements about the importance of environmental lawyers. There will always be a need for them as well as people skilled in government affairs who can represent a company's interests in dealings with state and federal regulators and legislators.

Mr. Farrell's overall advice to those who want to work for a corporation in the health, safety and environmental areas was to obtain a good, solid scientific education like a B.S. in chemistry, engineering or biology. He stressed the need to be active in seeking any kind of related experience. Personal contact is important in searching for opportunities.

Experience in industry, Mr. Farrell said may be different than what you expect. You will learn a great deal which will be valuable whether you stay in industry or move to the government sector. In fact, Mr. Farrell said that some of the best regulators in agencies like the U.S. EPA are those who have worked in industry for five or ten years. They understand the problems, the technology and are more receptive to suggestions from people in industry who are dealing with the issues.

Mr. Farrell concluded his presentation by discussing EIP (Environmental Intern Program) of The CEIP Fund. The Standard Oil Company has used EIP Associates in their health, safety and environmental areas. He cited preliminary data from a recent survey of EIP alumni that about two-thirds of them went on to environmentally related positions after their EIP work. Mr. Farrell said that this was a good track record and reflected a high opinion of EIP among corporate, government and nonprofit employers.

Sharing Resources and Strategies

The last series of sessions at the conference was designed as a "brainstorming session" for participants with similar interests. The focus was on discussion of publications, people, programs, events and ideas that would be helpful in finding summer, part-time and/or permanent positions in environmental protection and resource management.

Participants had a selection of the following five sessions. They were asked to choose the session that most closely reflected their job search interests.

1. Environmental protection with corporations.
2. Resource management with corporations.
3. Environmental protection with government agencies.
4. Resource management with government agencies.
5. Environmental positions with nonprofit organizations.

Each forty-five minute session had a facilitator who explained the goals of the session and divided the participants into small groups of four to six people. For fifteen to twenty minutes, each small group addressed the question "What/who are the programs, people, publications, ideas, etc. that will be helpful in finding positions in (session title)? At the end of this segment, the participants came back together as a large group. For the remaining twenty to twenty-five minutes, the facilitator and participants identified the job search resources and ideas discussed in the small groups.

Following is a summary of what was generated in the sessions by the participants. These resources and ideas show that there are many ways and means available to environmental career seekers. They also illustrate that job searchers can help each other through sharing successes and the lessons of failures.

Publications

* Trade journals. These often have a "want ads" section and listings of environmental conferences and meetings. Advertisers in these journals often employ environmental professionals. A letter to the advertiser inquiring about positions was a technique mentioned.

* Newsletters, magazines and journals of environmental organizations often have want ads, advertisers and event schedules.

* Newspapers have articles on environmental issues and topics that often identify potential employment opportunities.

* Specialty newsletters aimed at environmental professionals often have valuable information related to employment opportunities and updates on legislation and governmental appropriations which reflect potential needs for professionals.

* Job bulletins from environmentally related departments and schools at colleges and universities as well as from a career planning and placement office.

* Directories of organizations, agencies, people, etc. in the environmental fields.

* Proceedings and summaries from environmental conferences can provide insight on current or upcoming employment opportunities.

* "Environmental Career Planning Resources" in this publication as an appendix was distributed during the conference mini-session on "Resources for the Environmental Job Search". It contains many publications in the categories listed above.

People

* College faculty

* Graduate students in environmental programs. Many have had summer, part-time or permanent positions. Thus, they can be a resource for undergraduates.

* Alumni of environmental programs. No matter if they are in entry level or management positions. Alumni are valuable resources for undergraduate and graduate students from their alma mater.

* State senators and representatives and their staff are often helpful in learning about state agency positions.

* Informational interviewing especially with people in organizations who have responsibility for providing information.

* Professional associations. Many have regional, state, local and even college (student) chapters. Student membership rates are also available. "Environmental Career Planning Resources" in this publication as an appendix lists many environmental professional associations as well as other membership organizations focusing on the environment.

Programs and Events

* Internship, cooperative education and summer job programs.

* On-campus recruiting through a college's career placement office.

* Career fairs.

* Employment agencies, especially those that may serve recent college graduates.

* Volunteering with an environmental nonprofit organization.

- Conferences and meetings, especially sponsored by environmental professional organizations. Many of these conferences are annual events and offer student rates.
- Volunteer to work on a conference sponsored by an environmental professional organization or any type of environmental conference.
- Most, if not all, environmental programs of colleges have some kind of guest lecture series, career seminar or informal arrangements featuring environmental professionals who work with corporations, government agencies or nonprofit organizations.

Ideas

- Follow through on positions to which you apply. Be patient, but show interest.
- Apply for several positions in one organization, if possible. Often, these require similar skills.
- Be willing to accept a lower level position to start, especially if you have little or no experience.
- Work on political campaigns. If your candidate is elected, (s)he could be helpful with government positions.
- Libraries are a wealth of information. Use them. Just about all of the publications described in the "Environmental Career Planning Resources" appendix are in a good public or college library.
- Research organizations and write expressing your interest.
- Answer any want ad for positions close to your qualifications. Inquire about other needs the employer may have. Do this if you are under or overqualified for a position. Often the employer has or will have other needs.
- Personnel departments can be good sources of information about an organization, however you need to find the person, section, department, etc. that has the types of positions you desire.
- Learn the "environmental structure" of an organization, especially if you are interested in a corporation. How are they organized to comply with health, safety and environmental quality standards?
- When talking with professionals, ask them about people and organizations outside of their own field or organization. Environmental professionals interact with many other professionals in a variety of environmental fields who work with corporations, government agencies and nonprofits.

For similar advice related to job searching, see section in this publication, "Resources for the Environmental Job Search," page 50.

Appendices

Appendix 1

Environmental Career Planning Resources

Appendix 2

Profile of Conference Participants

Appendix 3

WE WANT YOUR IDEAS!

Appendix 4

To Order Additional Copies

Appendix 1

ENVIRONMENTAL CAREER PLANNING RESOURCES

Following is a listing of selected books, periodicals, directories, services, associations, etc. that will be helpful to environmental career seekers. These resources will lead you to other resources. If you find something that should be on this list, please write or call The CEIP Fund, 332 The Arcade, Cleveland, OH 44114. (216) 861-4424 We value your ideas!

Books/Directories

What Color Is Your Parachute? Richard Nelson Bolles. Ten Speed Press. Published annually. 1986 edition is the latest. This is a classic career planning/job search book. Buy it, if you do not have it. Around $8.00.

Don't Use A Resume...Use A Qualifications Brief. Richard Lathrop. Ten Speed Press. 1980. There are many, many resume writing books or sections of books. We do not think you can do much better than this one. Buy it! $1.95.

Opportunities in Environmental Careers. Odom Fanning. 1982. National Textbook Company. VGM Career Horizons Series. Twenty-two specialties in environmental protection and resource management including environmental health and urban/regional planning are covered. Description of duties, typical employers, education needed and job outlook are discussed along with resources for more information. A good library should have this.

Environmental Protection Careers Guidebook. U.S. Dept. of Labor and U.S. Environmental Protection Agency. 1980. A total of 107 environmental protection job titles are described along with requirements, opportunities and resources for more information. This should be at a good public or college library.

Conservation Directory. Published annually by the National Wildlife Federation. It has information on international, federal, state, regional and local organizations, agencies and officials concerned with the environment. It also has appendices covering periodicals and other directories. This should be available in a college library.

Great Lakes Directory of Natural Resources Agencies and Organizations. 1984/85. Produced by The Freshwater Society for The Center for the Great Lakes. Similar to the Conservation Directory except that it focuses on agencies and organizations in the U.S. and Canada having anything (even remotely) to do with water and land resources in the Great Lakes Basin. This may not be in a public library. Could be in a college library. Should be in the collection of a college professor who is interested in the Great Lakes. If you cannot find it, have a sympathetic librarian order it from The Center for the Great Lakes, 435 North Michigan Ave., Suite 1408, Chicago, IL 60611. (312) 645-0901. Price is $20.00.

Peterson's Guides to Undergraduate Study at Four and Two Year Colleges and Graduate Study. These two books are published annually. The undergraduate volume lists almost thirty environmental majors guiding you to colleges around the country offering programs. The graduate volume covers over fifteen majors. The guides have profiles of the colleges, although not any details about the majors. You have to contact the colleges. A college, high school or public library should have these guides.

Noyes Publications publishes a range of books on environmental protection topics. These are mainly specialized and geared for professionals. Thus, they can give an in-depth look at what environmental professionals need to know in order to conduct their work. These books should be found in college libraries. You can obtain a catalog by writing to Noyes c/o Mill Rd. at Grand Ave., Park Ridge, NJ 07656.

Lewis Publishers, Inc. also publishes a range of books on environmental protection topics aimed at professionals. For a catalog, write c/o 121 South Main Street, P.O. Drawer 519, Chelsea, Michigan 48118.

Island Press is a nonprofit publisher of books on environmental protection and resource management aimed at professionals and concerned citizens. A real wide range of technical, policy and general books are featured. For a catalog, write c/o 1718 Connecticut Ave., NW, Suite 300, Washington, DC 20009

Encyclopedia of Associations. Gale Research Company. 1987. Four major volumes. Volume 1 is National Organizations of the United States (Part I, Part II, Name and Keyword Index). Volume 2 is Geographic and Executive Indexes. Volume 3 is New Associations and Projects (to Volume 1). Volume 4 is International Organizations, and also there is International Organizations Supplement. Brainstorm any topic, interest, group of people, or professional field. Combine them any way you like. There is probably some kind of association! You can find it here. Start with Volume 1, Part 3. Name and Keyword Index. This guides you to listings in the other volumes which give a description of the organization, including information on number of members, staff, budget, regional or local groups, committees, publications, conferences and meeting frequency/schedule. A great resource available in public and college libraries.

Consultants and Consulting Organizations Directory. Gale Research Company. Sixth Edition, 1984. Supplements, No. 1 and 2, 1985. Has fourteen major sections according to general consulting activity, including "Environment," "Agriculture, Forestry and Landscaping," "Health, Medicine and Safety," and "Engineering, Science and Technology." There is a subject index arranged by geographic location. Entries include name, address, telephone number, founding date, principal executive, branch offices, purposes and activities, recent publications, conferences and special services. Available in public and college libraries.

Directory of Directories. Gale Research Company, 1985. Subtitled "An annotated guide to business and industrial directories, professional and scientific rosters, directory of databases and other lists and guides of all kinds." Like the Encyclopedia of Associations, this is a very comprehensive publication. No matter what your environmental career interest, there is a directory of some kind that could help you. The subject index alone is almost 200 pages! Available in public and college libraries.

Services and Programs Providing Environmental Work Experience/Information

The CEIP Fund is a nonprofit organization that every year develops about three hundred paid, professional level positions for college students and recent graduates in environmental protection, resource management and community development. Positions are with corporations, government agencies and nonprofits in seventeen states in five regions: Northeast, Great Lakes, Pacific Northwest, Northern California and Southern California. They usually are three month to six months in length, occasionally up to one year. Salaries are from $200 to $600 per week. Before starting a position, applicants should have completed three years of college. For more information and applications, contact The CEIP Fund, 68 Harrison Ave., Boston, MA 02111 (Also see p. 41 to 46 of this publication).

Student Conservation Association is a nonprofit organization that every year develops over one thousand resource management positions in federal, state and private parks and natural lands across the country. They have two programs: High School and Advanced Work Groups(Spring and Summer). About 300 volunteer positions per year. Volunteers serve in co-educational groups of six to twelve participants with one or two adult supervisors. These groups spend between three to five weeks operating out of a tent base camp and complete a work project assigned to them. One of the weeks is spent on a backpacking hike or some other form of exploratory activity. Park, Forest and Resource Assistant Program. (All year) Open to anyone 18 years or older who has graduated from high school and has been out of high school for at least one year. No upper age limit. About 750 positions per year involved with resource, recreation, forest, wildlife and fisheries management; educational programs and research in many fields. Positions are usually twelve week assignments and include a travel grant, free housing, stipend for food and basic living expenses (Approx. $40 per week) and uniform allowance (if needed). For more information and applications, contact SCA c/o P.O. Box 550, Charlestown, NH 03603.

Environmental Opportunities is a monthly, eight page listing of permanent, part-time and internship opportunities around the country in primarily resource management with nonprofits and government agencies. New subscription for 6 months is $22.00. One year is $39.00. Two years is $64.00. Renewal rates are a little less. Write c/o P.O. Box 670, Walpole, NH 03608.

The Nature People has a job information service which focuses primarily on natural resource management positions with federal agencies, state agencies, nature centers, parks and recreation centers, game preserves, universities, consultants and private companies. "Jobs Bulletin" (2 issues per month) covers permanent and temporary positions. $52/year for individuals. "Summer Jobs Announcement" (Available Jan-Apr) is a $15 publication listing summer/seasonal jobs. "Employment Guide" for $8 has 58 pages of information and resources for those interested in federal positions. Write c/o P.O. Box 98, Warrens, WI 54666. Attention: Career Services.

National Directory of Internships. National Society for Internships and Experiential Education. 1984. Has a 36 page section on "Environmental Affairs" covering mainly nonprofit opportunities. A college career services office should have this publication.

Periodicals

Business Publishers, Inc. has a "family" of environmental newsletters that are published weekly or biweekly and are designed for environmental professionals. These eight page periodicals include Air/Water Pollution Report, Ecology USA, Hazardous Waste News, Land Use Planning Report, Groundwater Monitor, Toxic Materials News, Solid Waste Report and World Environment Report. Since these are specialty newsletters, each one is expensive--two or three hundred dollar range per year. You will probably not find them in a public library. Places that may have one or more of the newsletters are: university graduate library; college engineering, law, or public health library; an environmental related program at a college that has a library. A college professor who specializes in one of the areas covered by the newsletter may be a source. If all else fails, contact a public agency involved in an area covered by one of the newsletters. Their specialists may have insight on where to find them. Business Publishers can be reached at 951 Pershing Drive, Silver Springs, MD 20910. (301) 587-6300.

Environment Reporter. Weekly. 30-50 pages. Bureau of National Affairs, Inc., 1231 25th Street, NW, Washington, DC 20037. Covers pollution control and environmental activities in Congress, federal agencies, state capitals and courtrooms. Also includes an environmental law reference library which is kept current through updates. This is really an information service which costs over $1,300 per year. A large public library, university library, or college law library may have this service.

EPA Environmental Events Calendar."A listing of meetings, hearings, seminars, conferences and other environmentally oriented events in EPA Region 5 comprising the states of Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin." Free monthly. Contact U.S. EPA Region 5, Office of Public Affairs, 230 South Dearborn St., Chicago, IL 60604. A college program and/or professor involved in the environmental field may already be receiving this periodical. Other EPA regional offices may produce a similar publication.

*** Many more periodicals listed in next section.

Finding People, Professionals and Publications With Your Interests

We went to the Encyclopedia of Associations and have outlined below by field some of the organizations that you should consider if you want to be an environmental professional. These organizations have departments, regional or local branches, publications, meetings and conferences that can help with your career interests. Many of these have student membership rates. The professional organizations often have information on college programs related to their interests. Please note that the word "Pro" after the address denotes a professional association. Selected publications of each organization are listed.

Environmental Protection

National Association of Environmental Professionals. P.O. Box 9400, Washington, DC 20016. Pro. Newsletter, monthly. The Environmental Professional Journal, quarterly.

American Chemical Society. 1155 16th St., NW, Washington, DC 20036. Pro. Almost thirty periodical publications including Environmental Science and Technology, monthly.

American Institute of Chemical Engineers. 345 E. 47th St., New York, NY 10017. Pro. Many periodicals including Environmental Progress, quarterly.

American Public Works Association. 1313 E. 60th St., Chicago, IL 60637. Pro. Reporter, monthly.

Environmental Law Institute. 1616 P St., NW, Suite 200, Washington, DC 20036. Pro. Environmental Forum, Environmental Law Reporter, monthlies.

American Academy of Environmental Engineers. P.O. Box 269. 93 Main St., Annapolis, MD 21404. Pro. The Diplomate, quarterly.

Association of Environmental and Resource Economists. 1616 P St., NW, Washington, DC 20036. Pro. Journal of Environmental Economics and Management, quarterly.

Association of Interpretive Naturalists. 6700 Needwood Rd., Derwood, MD 20855. Pro. Newsletter, monthly. Journal, semiannual.

American Society for Environmental Education. P.O. Box 800, Wheeler Professional Park, Hanover, NH 03755. Pro. Environmental Education Report and Newsletter, quarterly.

North American Association for Environmental Education. P.O. Box 400, Troy, OH 45373. Pro. Newsletter, bimonthly.

Sierra Club. 730 Polk St., San Francisco, CA 94109. Sierra, bimonthly.

Natural Resources Defense Council. 122 E. 42nd St., New York, NY 10168. Amicus Journal, quarterly.

Environmental Task Force. 1346 Connecticut Ave., NW, Suite 912, Washington, DC 20036. Eco-Alert and RE:SOURCES, quarterlies.

Environmental Defense Fund. 444 Park Ave. S. New York, NY 10016. Newsletter, monthly.

Citizens for a Better Environment. 506 S. Wabash, Suite 523, Chicago, IL 60605. Environmental Review, quarterly.

Environmental Action. 1525 New Hampshire Ave., NW, Washington, DC 20036. Environmental Action (magazine), monthly.

The Cousteau Society. 930 W. 21st St., Norfolk, VA 23517. Calypso Log Dispatch, monthly.

Air Quality

Air Pollution Control Association. P.O. Box 2861, Pittsburgh, PA 15230. Pro. Journal of the Air Pollution Control Association, monthly.

Water Quality

Water Pollution Control Federation. 2626 Pennsylvania Ave., Washington, DC 20037. Pro. Journal, monthly.

American Water Works Association. 6666 W. Quincy Ave., Denver, CO 80235. Pro. Journal, monthly and Water World News, monthly.

National Water Well Association. 6375 Riverside Dr., Dublin, OH 43017. Pro. Newsletter, monthly. Water Well Journal, monthly.

International Association for Great Lakes Research. c/o Inst. of Science and Technology, Univ. of Michigan, Ann Arbor, MI 48109. Pro. Journal of Great Lakes Research, quarterly

Association of Ground Water Scientists and Engineers. 6375 Riverside Drive, Dublin, OH 43017. Pro. Journal of Ground Water, bimonthly.

Solid Waste Management

National Solid Wastes Management Association. 1730 Rhode Island Ave., NW, Suite 1000, Washington, DC 20036. Pro. Waste Age, monthly.

Hazardous Waste Management

Hazardous Materials Control Research Institute. 9300 Columbia Blvd., Silver Spring, MD 20910. Pro. FOCUS (newsletter), monthly. Journal on Hazardous Waste and Hazardous Materials, quarterly.

Environmental Health

National Environmental Health Association. 720 S. Colorado Blvd., Suite 970. Denver, CO 80222. Pro. Journal of Environmental Health, bimonthly.

American Industrial Hygiene Association. 475 Wolf Ledges Pky., Akron, OH 44311. Pro. Journal, monthly.

American Public Health Association. 1015 15th St., NW, Washington, DC 20005. Pro. American Journal of Public Health, monthly.

Society of Environmental Toxicology and Chemistry. P.O. Box 4352. Rockville, MD 20850. Environmental Toxicology and Chemistry, quarterly.

Resource Management

Friends of the Earth. 1045 Sansome St., San Francisco, CA 94111. Not Man Apart, bimonthly.

The Nature Conservancy. 1800 N. Kent St., Arlington, VA 22209. News, bimonthly.

Wilderness Society. 1400 Eye St., NW, Washington, DC 20005. Wilderness, quarterly.

Izaak Walton League of America. 1701 N. Fort Myer Dr., Suite 1100, Arlington, VA 22209. Conservation Update, monthly.

Greenpeace U.S.A. 1611 Connecticut Ave., NW, Washington, DC 20009. Greenpeace Examiner, quarterly.

Ecological Society of America. Dept. of Botany, University of Tennesee, Knoxville, TN 37996. Pro. Ecology, bimonthly.

Botanical Society of America. c/o David L. Dilcher, Biology Dept., Indiana Univ., Bloomington, IN 47405. Pro. American Journal of Botany, monthly.

Fisheries

American Fisheries Society. 5410 Grosvenor Ln., Bethesda, MD 20814. Pro. Fisheries (bulletin) monthly. North American Fisheries Management Quarterly.

International Association of Fish and Wildlife Agencies. 1412 16th St., NW, Washington, DC 20036. Pro. Newsletter, bimonthly.

Trout Unlimited. 501 Church St. NE, Vienna, VA 22180. Lines to Leaders, monthly.

Forestry

Society of American Foresters. 5400 Grosvenor Ln., Bethesda, MD 20814. Pro. Journal of Forestry, Forest Science, bimonthlies.

Association of Consulting Foresters. 5410 Grosvenor Ln., Suite 120, Bethesda, MD 20814. Pro. The Consultant, quarterly.

Municipal Arborists and Urban Foresters Society. P.O. Box 1255, Freehold, NJ 07728. Pro. Newsletter, bimonthly.

American Forestry Association. 1319 18th St., NW, Washington, DC 20036. American Forests Magazine, monthly.

Wildlife

Wildlife Society. 5410 Grosvenor Ln., Bethesda, MD 20814. Pro. Wildlifer, bimonthly. Journal of Wildlife Management, quarterly.

National Wildlife Federation. 1412 16th St., NW, Washington, DC 20036. A variety of biweekly, monthly and bimonthly publications.

National Audubon Society. 950 Third Ave., New York, NY 10022. Audubon (magazine), American Birds, bimonthlies.

Defenders of Wildlife. 1244 19th St., NW, Washington, DC 20036. Defenders Magazine, bimonthly.

World Wildlife Fund. 1255 23rd St., NW, Washington, DC 20037. Focus, bimonthly.

Land and Water Conservation

Soil Conservation Society of America. 7515 N.E. Ankeny Rd., Ankeny, IA 50021. Pro. Journal of Soil and Water Conservation, Conservogram, bimonthlies.

National Association of Conservation Districts. 1025 Vermont Ave., NW, Suite 730, Washington, DC 20005. Pro. Tuesday Letter, weekly.

Parks and Recreation

American Park and Recreation Society. 1800 Silos Deane Hwy. #1, Rocky Hill, CT 06067. Pro. Keeping You Current, quarterly.

National Society for Park Resources. 3101 Park Center Dr., Alexandria, VA 22302. Pro. Journal of Leisure Research, quarterly.

National Park and Recreation Association. 3101 Park Center Dr., 12th Floor, Alexandria, VA 22302. Parks and Recreation Magazine, monthly.

National Parks and Conservation Association. 1701 18th St., NW, Washington, DC 20009. National Parks, bimonthly.

American Park Rangers Association. c/o Gerald Avenberg, 1100 N.E. 125th St., Miami, FL 33161. Pro. The Wildernant, quarterly.

Urban and Regional Planning.

American Planning Association. 1776 Massachusetts Ave., NW, Washington, DC 20036. Pro. Planning Magazine, monthly.

The Urban Land Institute. 1090 Vermont Ave., Washington, DC 20005. Land Use Digest, Urban Land, monthlies.

American Society of Consulting Planners. c/o Bruce Yoder, 9001 Edmondston Rd., Greenbelt, MD 20770. Newsletter, monthly.

Metropolitan Association of Urban Designers and Environmental Planners. P.O. Box 722, Church St. Station, New York, NY 10008. Newsletter.

American Society of Landscape Architects. 1733 Connecticut Ave., NW, Washington, DC 20009. Pro. Landscape Architectural News Digest, monthly.

Association of American Geographers. 1710 16th St., NW, Washington, DC 20009. Professional Geographer, quarterly.

Partners for Livable Places. 1429 21st St., NW, Washington, DC 20036. PLACE, monthly.

Appendix 2

Profile of Conference Participants

Following are breakdowns of the participants at the conference according to a variety of categories. For more information, please contact Lee P. DeAngelis at The CEIP Fund, 332 The Arcade, Cleveland, OH 44114 (216) 861-4424.

Registered/Attended

173	# registered (of these, 16 were fee waivers)
171	# attended

Male/Female

89	Males
83	Females
172*	

By State

44	Ohio
8	Indiana
2	Illinois
104	Michigan
11	Pennsylvania
4	Other states (KS, IA, MN, LA)
173	

By Academic level/title

4	High School Students
2	Freshmen
4	Sophmores
18	Juniors
72	Seniors
22	Graduate Students
4	Community Colleges
17	Recent graduates with bachelors
4	Recent graduates with masters
11	Faculty & Staff
4	Career Advisors & Co-op Advisors
10	Professionals
172*	

* Reflects subtracting one unidentified person from a Pennsylvania college group who was registered, but did not attend.

Academic Majors of College Students/Recent Graduates in Attendance*

1.	Natural Resources/Conservation	31
2.	Environmental Studies/Sciences	27
3.	Urban/Regional Planning	3
4.	Law	1
5.	Engineering	7
6.	Chemistry	4
7.	Geology	12
8.	Biology	23
9.	Business/Public Administration	3
10.	Public/Environmental/Industrial Health	10
11.	Sciences (other)	7
12.	Geography	9
13.	Liberal Arts (other)	2
		139

* Does not include students from Community Colleges (5 in attendance) or high schools (4 in attendance).

Number of Colleges Represented by State

Michigan	21 (includes 2 community colleges)
Ohio	12 (includes one community college)
Pennsylvania	4
Indiana	2
Illinois	1
Kentucky	1
Wisconsin	1
Minnesota	1
Iowa	1
Louisiana	1
Ontario, Canada	1
	46 Colleges and Universities

Appendix 3

WE WANT YOUR IDEAS!

The CEIP Fund, through its Professional Development Services, wants your ideas for programs and publications that can help: (1) high school and college students plan more effectively for environmental careers, (2) high school and college advisors and faculty improve the advice they give students and recent graduates on these careers and (3) environmental professionals with their career development needs.

We welcome any and all suggestions including information on existing programs and publications that you have found to be useful in planning for environmental careers. We are particularly interested in your thoughts on these following questions:

* What kind of information should be included in an environmental career planning publication designed for college students and advisors?

* What are the job search resources and information needed by college students seeking environmental part-time, summer or permanent environmental positions?

* What are the best ways to reach high school students about environmental careers?

* What would you like to see included in a newsletter focusing on planning for environmental careers?

* What did you find helpful about this publication (conference summary)? What was missing?

Please send your responses, comments, suggestions and ideas to:

Mr. Lee P. DeAngelis
The CEIP Fund
Professional Development Services
332 The Arcade
Cleveland, OH 44114
(216) 861-4424

Thank you for your cooperation! Your input will help us in developing more effective programs and publications.

To Order Additional Copies

"Becoming an Environmental Professional -- Strategies for Career Planning" is $10.95. To order, please make check payable to: The CEIP Fund. Mail check and your name, address and telephone number to: The CEIP Fund, 332 The Arcade, Cleveland, Ohio 44114. The following discounts are available: 5 or more copies at $10.25 each; 15 or more copies at $9.75 each; 30 or more copies at $9.25 each. For more information, please write or call The CEIP Fund at (216) 861-4424.